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SELMAN AND KITZMILLER AND THE IMPOSITION OF DARWINIAN ORTHODOXY

*Robert J. D'Agostino**

I. INTRODUCTION

In popular understanding, Darwin's theory of evolution is equated with the "survival of the fittest." Natural or environmental factors favor (select) random, purposeless mutations which then gradually accumulate over time because they give organisms adaptive advantages thereby explaining the ever changing fossil record (descent with modification). This is Darwinian Orthodoxy in brief. Whether the evidence supports this orthodoxy is another question. And, whether those committed to imposing Darwinian Orthodoxy are concerned about the evidence is questionable. Rather they seem more interested, by use or misuse of the "wall of separation" interpretation of the Establishment Clause, in establishing a fortress designed to keep a presumed secular society isolated from even the hint of traditional religious belief.

In any case, the attempt by use of the courts to impose Darwinian Orthodoxy in the public school classroom is rooted in the ideological commitment of many to Darwinism. Darwinism is, for many atheists at least, a substitute for traditional religious beliefs as its adherents perhaps admit when they posit Darwinian theory as an all-encompassing explanation of existence; that is, they use it to explain fundamental and ultimate questions about life and creation.

Despite the best efforts of the courts and those supporters of Darwinian Orthodoxy, the American population is not buying it. According to a July 2005 survey sponsored by the Pew Forum on Religion & Public Life and the Pew Research Center for the People & the Press, 60 percent [of Americans]

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believe that humans and other animals have either always existed in their present form or have evolved over time under the guidance of a Supreme Being. Only 26 percent agree with Darwin that life evolved through natural selection. Finally, the poll found that 64 percent of Americans support teaching creationism alongside evolution in the classroom.¹

This article reviews both the current legal environment, with its emphasis on Establishment Clause jurisprudence to limit alleged religiously motivated expression, and the scientific evidence pointing to the incompleteness, and perhaps the eventual supersession of the Darwinian theory as the basis for evolutionary change, that is, the change in organisms over time as indicated by the fossil record.

With support from a scientific establishment, many members of which have little understanding of the ideological and philosophical issues, which like all establishments resists a paradigm shift until faced with overwhelming evidence, organizations such as the American Civil Liberties Union (“ACLU”) are successfully continuing their assault on free expression if not free inquiry. This is most successfully done when either proponents of non-Darwinian explanations set up a dualism involving creationism as the alternative, or when the proponents of Darwinian Orthodoxy as scientific truth, setup a false dualism claiming that all criticisms of Darwinian Orthodoxy are religiously based.

The reality of the evidence suggesting relationships among organisms, whether it be similarities in physical structure, genomes, and even behavior is not at issue—the issues reduce to how evolution is defined and what are the mechanisms driving changes over time.

By discussing the scientific issues involved, it is hoped that lawyers who are concerned with the imposition of Darwinian Orthodoxy may better argue their case for free expression and free inquiry.²

1. *From Darwin to Dover: An Overview of Important Cases in the Evolution Debate*, PEW FORUM LEGAL BACKGROUNDER, Sept. 2005, at 2.

2. See generally ROBERT J. D'AGOSTINO, *DARWINISM IN THE CLASSROOM: CRITIQUING ORTHODOXY AND SURVIVING IN THE CURRENT ENVIRONMENT* (2006).

II. BACKGROUND

A. *Darwinism*

Darwinism, as opposed to Darwin's theory of evolution, is a belief-system addressing the same fundamental and ultimate questions religion addresses.³ It is ideological in nature and brooks no disagreement. As Richard Dawkins famously stated, "Darwin made it possible to be an intellectually fulfilled atheist."⁴ He and others, if not the courts, had concluded that implications drawn and inferences made from Darwinism constitute a belief system dealing with the same concerns as traditional religions.⁵ Or, put slightly differently, it is a belief system addressing fundamental and ultimate questions, comprehensive in reach.⁶ As Dawkins further claimed, natural selection (Darwin's great idea) explains "the whole of life, the apparent design of life."⁷ This article will demonstrate that the imposition of Darwinian evolutionary theory, let alone, Darwinism (which is a philosophical inference), is not mandated by either constitutional law or science. Those with an ideological agenda, together with their allies in the courts and in the scientific establishment, argue that questioning the central dogmas of Darwinian Orthodoxy is bad science and an attempt to incorporate forbidden religious views into the public schools. This, it is claimed, constitutes a failure to protect the presumed sensibilities of a secularized society, as well as the non-Christian religious minority, as if such protection were constitutionally mandated. This judicial attitude is founded on the presumed, or perhaps observed, divisiveness of religion.⁸

The Supreme Court's hostility towards religion is evident in the dissent in *Everson v. Board of Education*⁹ that the "wall of

3. Richard Dawkins, *Is Science a Religion?* THE HUMANIST, Jan/Feb 1997, 26-27.

4. RICHARD DAWKINS, THE BLIND WATCHMAKER 6 (1996).

5. Dawkins, *supra* note 3, at 27.

6. *Id.*

7. NEIL A. CAMPBELL, JANE B. REECE, & LAWRENCE G. MITCHELL, BIOLOGY 413 (5th ed. 1999).

8. See *McCollum v. Bd. of Educ.* 333 U.S. 203, 231 (1948) (Frankfurter, J., concurring); Richard W. Garnett, *Religion, Division and the First Amendment*, 94 GEO. L. J. 1667, 1668 (2006).

9. 330 U.S. 1, 18, (1947) (Jackson, R., dissenting).

separation” language of the majority only hinted at.¹⁰ The dissent presaging future Supreme Court opinions stated:

The Amendment’s purpose was not to strike merely at the official establishment of a single sect, creed or religion, outlawing only a formal relation such as had prevailed in England and some of the colonies. Necessarily, it was to uproot all such relationships. But the object was broader than separating church and state in this narrow sense. It was to create a complete and permanent separation of spheres of religious activity and civil authority comprehensively forbidding every form of public aid or support for religion.¹¹

In reality, much of Darwinian Orthodoxy is based on inference, as shall be demonstrated later. In fact, inferences from Darwinian Orthodoxy are often used to explain as Dawkins’ claimed all or most of human behavior including altruism, religious belief, cooperation, and cheating.

These inferences are used by such as Edmond O. Wilson,¹² Paul Rubin,¹³ Daniel C. Dennett¹⁴ and other prominent social scientists. Apparently those inferences are acceptable while religious ones are not.

Paul Rubin, while stating that all humans are a result of natural selection,¹⁵ a distinctly biological concept, states that certain behaviors “[raise] the issue of cultural rather than biological selection of preferences. . . . Cultural and genetic evolution can reinforce each other.”¹⁶ Is this Darwinian? Does this comport with the biological determinism implicit in Darwinian Orthodoxy? Rubin, despite the title of his book, avers that he does not “argue for biological determinism.”¹⁷ Rather he seems to argue that biology, that is, the genetic make up of humans, places certain constraints, and makes possible potential behaviors. Yet, he also states that “[natural

10. *Id.* at 16. “Neither can [a state nor the Federal Government] pass laws which aid one religion, aid all religions, or prefer one religion over another. . . . In the words of Jefferson, the clause against establishment of religion by law as intended to erect ‘a wall of separation between Church and State.’” *Id.* at 15-16. Further, “[t]hat wall must be kept high and impregnable. We could not approve the slightest breach.” *Id.* at 18.

11. *Id.* at 31-32.

12. EDMOND O. WILSON, *SOCIOBIOLOGY* (2000).

13. PAUL H. RUBIN, *DARWINIAN POLITICS: THE EVOLUTIONARY ORIGIN OF FREEDOM* (2003).

14. DANIEL C. DENNETT, *DARWIN’S DANGEROUS IDEA* (1995).

15. RUBIN, *supra* note 13, at 8.

16. *Id.* at 64.

17. *Id.* at xiii.

selection in the Darwinian sense] is the theoretical basis for the entire discipline of biology and will ultimately become the basis for the social sciences as well.”¹⁸ This assertion is, if nothing else, a rather all-encompassing inference. And it is the effective mandating of certain inferences in the biology classroom that is really at issue in the battle over the teaching of evolution in public school.

Despite court decisions to the contrary, there are religious dimensions to Darwinism. Although the Establishment Clause may seem to refer to a church or an institution, case law holds otherwise. In fact, the Supreme Court has defined religion for purposes of the Free Exercise and Establishment Clauses somewhat differently. In a series of cases,¹⁹ beliefs and practices analogous to traditional religious faiths, that is, belief systems and practices dealing with the same concerns as traditional religions, are considered religions for purposes of the Free Exercise Clause.²⁰ If we take Dawkins seriously, Darwinism would also qualify as a religion. As the eminent biologist Franklin Harold observed,²¹ Stephen Jay Gould’s “tweaks” of Darwinian Orthodoxy stirred a tempest among the true believers in Darwin’s “church” such as Dawkins and Dennett.²²

And, as a true believer, the always-provocative Dawkins stated:

With so many mindbytes to be downloaded, so many mental codons to be replicated, it is no wonder that child brains are gullible, open to almost any suggestion, vulnerable to subversion, easy prey to Moonies, Scientologists and nuns. [Should he have added ideologues masquerading as

18. *Id.* at 8 (citing EDWARD O. WILSON, *CONSILIENCE: THE UNITY OF KNOWLEDGE* (1998)).

19. *See, e.g.*, *U.S. v. Seeger*, 380 U.S. 163, 165-166 (1965) (We have concluded that Congress, in using the expression ‘Supreme Being’ rather than the designation ‘God,’ was merely clarifying the meaning of religious training and belief so as to embrace all religions and to exclude essentially political, sociological, or philosophical views. We believe that under this construction, the test of belief ‘in a relation to a Supreme Being’ is whether a given belief that is sincere and meaningful occupies a place in the life of its possessor parallel to that filled by the orthodox belief in God . . .); *Reynolds v. U.S.*, 98 U.S. 145 (1878); *Wolman v. Walter*, 433 U.S. 229 (1977).

20. *See* the discussion of “ultimate concern and ultimate truth,” “comprehensiveness” and the “subject matter” dealt with as defining ultimate religion. MICHAEL S. ARIENS & ROBERT A. DESTRO, *RELIGIOUS LIBERTY IN A PLURALISTIC SOCIETY* 990-91 (1996).

21. FRANKLIN HAROLD, *THE WAY OF THE CELL* 195 (2001).

22. *Id.*

scientists?]. . . . Most people, I believe, think that you need a God to explain the existence of the world, and especially the existence of life. They are wrong, but our education system is such that many people don't know it. Faith is the great cop-out, that great excuse to evade the need to think and evaluate evidence. Faith is belief in spite of, even perhaps because of, the lack of evidence. [Does faith in extrapolation from micro to macroevolution count?] Yet scientists are required to back up their claims not with private feelings but with publicly checkable evidence. Religions do make claims about the universe—the same kinds of claims that scientists make, except they're usually false. . . . Never say, and never take seriously anyone who says, "I cannot believe that so-and-so could have evolved by gradual selection." I have dubbed this kind of fallacy, "the Argument from Personal Incredulity." Time and again, it has proven the prelude to an intellectual banana-skin experience.²³

While claiming that animals, including humans, exist for the preservation of genes, and are nothing more than the genes "throw away survival machines,"²⁴ Dawkins goes on to assert that humans have the power to rebel against the designs of the selfish gene.²⁵ Where does such power originate? Is the answer in the genes, a result of culture generally, from religious belief specifically or from brain-powered foresight? Is Dawkins making an empirical observation or a statement of faith? Is man a "very special case"?²⁶

Although *McLean v. Arkansas Board of Education*²⁷ and *Wright v. Houston Independent School District*²⁸ both denied there is religious content to Darwinism, Dawkins and others sharing his views are not so sure.²⁹ Dawkins opines that traditional religious faith is one of the world's great evils since it is belief not based on evidence. He points to the sectarian violence in Northern Ireland and the Middle East as proof. However, as Rubin points out, "[w]hile many wars have been

23. John Catalano, *Quotes and Excerpts from Richard Dawkins*, <http://www.simongi.of.ac.uk/dawkins/WorldOfDawkins-archive/Catalano/quotes.shtml> (last visited Sept. 5, 2009).

24. DAWKINS, *supra* note 4, at Jacket.

25. *Id.*

26. *Id.*

27. 529 F. Supp. 1255, 1273-74 (D. Ark. 1982).

28. 366 F. Supp. 1208, 1210 (S.D. Tex. 1972), *aff'd per curiam*, 486 F.2d 137 (5th Cir. 1973), *cert. denied*, 417 U.S. 969 (1974).

29. See *supra* notes 3-7, 23, *infra* text accompanying note 37.

fought and are still being fought over religious differences, I conjecture that the inclusiveness of the modern major religions has net reduced warfare by implicitly expanding the size of groups” by moving away from hunter-gatherer and clan based groups.³⁰ He then cites Anthropology Professor Keeley³¹ for the proposition “that rates of death from war in primitive societies are much higher-up to twenty times higher – than in modern societies.”³² Perhaps the cultural influences on human behavior stem from religious beliefs. Culture is, after all, derived from “cult” which is defined as “a particular form or system of religious worship.”³³

Dawkins contends that religious faith lacks evidence, in contrast to science, which “is based upon verifiable evidence.”³⁴ Note the word used is verifiable, not verified. Whether all of the tenets of Darwinian Orthodoxy are verifiable is questionable. As Dawkins observes:

We come to our individual consciousness in a mysterious universe and long to understand it. Most religions offer a cosmology and a biology, a theory of life, a theory of origins, and reasons for existence. In doing so, they demonstrate that religion is, in a sense, science; it’s just bad science. Don’t fall for the argument that religion and science operate on separate dimensions and are concerned with quiet separate sorts of questions. Religions have historically always attempted to answer the questions that properly belong to science. Thus religions should not be allowed now to retreat away from the ground upon which they have traditionally attempted to fight. They do offer both a cosmology and a biology; however, in both cases it is false.³⁵

Dawkins further suggests that, “children would look at the spellbinding wonders of the living kingdoms and would consider Darwinism alongside the creationist alternatives and make up their own minds. I think the children would have no difficulty in making up their minds the right way if presented with the evidence.”³⁶ This equal time plea is not for science classes, however, but rather for religious education classes. It

30. RUBIN, *supra* note 13, at 36.

31. LAWRENCE H. KEELEY, *WAR BEFORE CIVILIZATION* (1996).

32. RUBIN, *supra* note 13, at 36.

33. IV THE OXFORD ENGLISH DICTIONARY 119 (2d ed. 1991).

34. Dawkins, *supra* note 3, at 27.

35. *Id.*

36. *Id.* at 28.

is the increasingly forced requirement that students not consider non-Darwinian explanations that may or may not lead to inferences of non-natural or non-material causes that are objectionable which is hardly viewpoint neutral.

The awe and the intellectual fulfillment that Dawkins finds in his interpretations of evolutionary theory lead him to the following:

Well, moving on, then, from morals to last things, to eschatology, we know from the second law of thermodynamics that all complexity, all life, all laughter, all sorrow, is hell bent on leveling itself out into cold nothingness in the end. They – and we – can never be more than temporary, local buckings of the great universal slide into the abyss of uniformity. . . . There is a very, very important difference between feeling strongly, even passionately, about something because we have thought about and examined the evidence for it on the one hand, and feeling strongly about something subsequently hallowed by tradition. There's all the difference in the world between a belief that one is prepared to defend by quoting evidence and logic and a belief that is supported by nothing more than tradition, authority, or revelation.³⁷

As Richard C. Lewontin, who “ingested [his] unwavering atheism and *a priori* materialism along with the spinach at the parental diner table”³⁸ observed:

At the same time that religious forces have been attempting to destroy evolutionary biology by denying its truth, a movement within academia has been attempting to make Darwinism a universal model for an understanding of history and social dynamics. . . .

If Darwinism is to satisfy the demand for generality then it must explain not only the evolution of the physical structure of the organism but of its individual and social behavior. . . .

. . . .

The searches for the general in the biological sciences and for legitimacy in explaining human social phenomena have converged in the creation of Darwinian models of human nature, of culture, and of history. . . .

37. *Id.* at 29. See *infra* text accompanying note 82.

38. Richard C. Lewontin, *The Wars Over Evolution*, 52 N. Y. Rev. of Books 16 (Oct. 20, 2005), available at <http://www.nybooks.com/articles/18363>.

The first attempts at generalization, epitomized by E.O. Wilson's *Sociobiology: The Modern Synthesis*, were simple extensions of evolutionary theory within biology to nonphysical characters. A universal human nature was described, including such properties as religiosity, aggression, entrepreneurship, and conformity. Genes for these traits were postulated, and adaptive stories were invented to explain why they were established by natural selection. The credibility of these models was eventually undermined by the lack of evidence of genetic determination of such traits and by the slipperiness of attempts at trying to define the "universal" characteristics of human nature. So when I once pointed out to a sociobiologist that sane and rational human beings were willing to go to prison rather than engage in armed struggle, he replied that their resistance to the state was a form of aggression. One need not be an orthodox follower of Karl Popper to see that a theory that allows things to appear in the form of their apparent opposites when convenient is not of much value. . . . Metaphorical Darwinian models of cultural and historical behavior do not contain genes, but contain cultural variants that arise like gene mutations and that are somehow differentially propagated over time in human minds and institutions, resulting in cultural evolution. The first, rather simple formulation of such a model in 1982 by Richard Dawkins contains elementary particles of culture, *memes*, playing the role of genes, which are propagated to greater or lesser degrees because they are more or less appealing to people.³⁹

These comments by Lewontin were made in the context of a review of two books. The first book reviewed, written by Michael Ruse, a philosopher of science and a Darwinian is *The Evolution - Creation Struggle*.⁴⁰ He identified the struggle as religious in nature.

The second book is *Not By Genes Alone: How Culture Transformed Human Evolution*⁴¹ authored by Peter Richerson and Robert Boyd. As Lewontin puts it, *Not By Genes Alone* is concerned with academics "in search of a universal theory of human society and history, [who] embrace Darwinism in a fit of

39. *Id.*

40. MICHAEL RUSE, *THE EVOLUTION-CREATION STRUGGLE* (Harvard University Press 2005). Prof. Ruse also wrote *DARWIN AND DESIGN: DOES EVOLUTION HAVE A PURPOSE* (Harvard University Press 2003).

41. PETER J. RICHARDSON AND ROBERT BOYD, *NOT BY GENES ALONE* (The University of Chicago Press 2005).

enthusiasm, threatening its status as a natural science by forcing its explanatory scheme to account not simply for the shape of brains but for the shape of ideas.”⁴² Perhaps Harold summed up the fight to defend Darwinism orthodoxy best when he wrote:

There is theological fervor to this dispute (conducted among protagonist who, after all are basically on the same side) that suggests that what is at stake here goes beyond mechanisms and even personalities. The modern synthesis is reductionist in the sense that it credits the order of nature to the lowest possible level, the struggle among individuals (and even genes) for selective advantage. The framework makes some allowances for supplements to adaptation and graduated change, but restricts their scope. Gould's heresy is to enlarge that space, in the belief that evolution is richer and quirkier than current orthodoxy allows thanks to infusions of nonadaptive novelty, episodic jumps, and a heavy dose of sheer contingency. And Gould, Eldredge and their supporters are no longer lone voices in the wilderness. Their call for a more hierarchical view of nature, and for the restoration of the organism to its traditional place of honor, finds echoes in the writing of some developmental biologists and of students of complex systems.⁴³

A comment by neuroscientist Rodney Holmes may be relevant to the above. He stated that “[f]rom our knowledge of how the brain constructs reality, we may conclude that there are realities that are not material. They include social reality; psychological reality; and metaphysical reality. It is a fundamental mistake to reduce them to material reality.”⁴⁴ I am not suggesting that a high school biology class, or even an introductory college course in biology or evolution, is an appropriate place to consider the philosophical and metaphysical musings of Lewontin, Ruse, Richardson and Boyd, and Holmes but at the same time why is an interview with Richard Dawkins included in a widely used textbook which also claims that Darwinism “Shook the deepest roots of Western Culture”⁴⁵ without further discussion. Why then discriminate against a different point of view if the federal

42. Lewontin, *supra* note 38.

43. HAROLD, *supra* note 21, at 196.

44. Rodney Holmes, *Homo Religiosus and its Brain, Reality, Imagination and the Future of Nature*, 31 ZYGON 441, 451 (1996).

45. CAMPBELL ET AL., *supra* note 7, at 414.

courts are genuinely concerned with neutrality and believe viewpoint discrimination to be unconstitutional?

Rather than raising the issue of viewpoint discrimination, the plaintiffs in *Wright*, while claiming that the teaching of evolution established a “religion of secularism”⁴⁶ in contravention of *School District of Abington Township v. Schemp*,⁴⁷ did not claim that students were forbidden to question evolution. Nor, more significantly, did they claim that secular or non-religious inferences were mandated as facts.

In *McLean*, the court pointed out that if the teaching of evolution is a religion, the remedy is not to teach the tenets of another religion (creationism) but rather to forbid the teaching of both.⁴⁸ As in *Wright* plaintiffs failed to establish what about the teaching of evolution could be analogized to a religion. To say that evolution contradicts a literal interpretation of the Bible is not sufficient.

Alvarado v. City of San Jose, defined religion as a belief system addressing fundamental and ultimate questions, comprehensive in reach, with certain formal and external signs.⁴⁹ This test apparently controls for Free Exercise purposes. Perhaps the deference shown to Darwinian Orthodoxy in biology texts is a substitute for formal and external signs. For Establishment Clause purposes any inference of the divine, God or a creator seems sufficient. Darwinism may be a religion for Free Exercise purposes but not for Establishment Clause purposes. Despite some equivocation by the Supreme Court⁵⁰ any reference to an alleged non-material theory in a context that a “reasonable observer” could construe as an endorsement,⁵¹ particularly in a setting that involves mandatory attendance and children, is precluded.⁵² This is not to say that Establishment Clause

46. *Wright*, 366 F. Supp. at 1209.

47. 374 U.S. 203 (1963).

48. *McLean*, 529 F. Supp. at 1273-1274.

49. 94 F.3d 1223 (9th Cir. 1996).

50. *Edwards v. Aguillard*, 482 U.S. 578 (1987).

51. *Allegheny v. ACLU*, 492 U.S. 573, 585 (1989).

52. See *Wallace v. Jaffree*, 472 U.S. 38 (1985); *Lee v. Weisman*, 505 U.S. 377 (1992); *McCreary County, Kentucky v. ACLU of Kentucky*, 125 S. Ct. 2722 (2005).

jurisprudence is consistent⁵³ as it alternates between accommodationist and strict separationist positions.⁵⁴

B. Science Defined

Science is, [i]n modern use, often treated as synonymous with 'Natural and Physical Science,' and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws, sometimes with implied exclusion of pure mathematics. This is now the dominant sense in ordinary use.⁵⁵

References to the word "theory" abound in court discussions and the literature. Perhaps the best and clearest explanation is by A. Aharani.⁵⁶ When describing the relationship between observation (fact) and theory, he states:

It is wrong to say, 'The apple falls from the tree because it is pulled by Earth's gravitational field.' It is wrong because the Earth's gravitational field is a *theory*, while the falling of the apple is an experimental *fact* which can be measured and verified. The *correct* way for a physicist to phrase the above

53. *Lee v. Weisman*, 505 U.S. 577, 592 (1992) ("[T]here are heightened concerns when protecting freedom of conscience from subtle coercive pressure in the elementary and public schools.") Coercion is not a "necessary element of any claim under the Establishment Clause." *Engle v. Vitale*, 370 U.S. 421, 430 (1962):

To require a showing of coercion, even indirect coercion, as an essential element of an Establishment Clause violation would make the Free Exercise Clause a redundancy. See *Sch. Dist. Of Abington Twp. v. Schempp*, 374 U.S. 203, 223, (1963) ("The distinction between the two clauses is apparent – a violation of the Free Exercise Clause is predicated on coercion while the Establishment Clause violation need not be so attended. . . . To be sure, the endorsement test depends on a sensitivity to the unique circumstances and context of a particular challenged practice and, like any test that is sensitive to context, it may not always yield results with unanimous agreement at the margins. But that is true of many standards in constitutional law, and even the modified coercion test offered by Justice Kennedy involves judgment and hard choices at the margin.")

Id. at 628-29. See LEONARD LEVY, *THE ESTABLISHMENT CLAUSE* 162 (1986): "The Court has reaped the scorn of a confused and aroused public because it has been erratic and unprincipled in its decisions. . . . The Supreme Court has been inexcusably inconsistent in its interpretation of the establishment clause."

54. Both positions cite James Madison for support as did both the majority and minority opinions of *Everson v. Board of Education* which first held the Establishment Clause applicable to the states. See, the discussion in Michael S. Ariens & Robert A. Destro, *Religious Liberty in a Pluralistic Society* 88-98 (1996). See discussion of Madison's views starting with Memorial and Remonstrance (1794) and the Federalist Papers (1787-88) and culminating with the Detached Memoranda and other post-presidency writings in *Religion and American Law* (Paul Finkelman, ed. 2000).

55. XIV THE OXFORD ENGLISH DICTIONARY 649 (2d ed. 1991).

56. A. Aharani, *Agreement Between Theory and Experiment*, PHYSICS TODAY, 48(6) at 33 (1995).

statement is, 'We *hypothesize* the existence of a gravitational field because we *observe* the apple falling from the tree.' The difference between these two statements is the basis for the whole philosophy of physics.⁵⁷

In *McLean*⁵⁸ Judge Overton attempted a legal definition of science as follows: "1) It is guided by natural law; 2) It has to be explanatory by reference to natural law; 3) It is testable against the empirical world; 4) Its conclusions are tentative, i.e., are not necessarily the final word; and 5) It is falsifiable."⁵⁹

The Supreme Court has a similar view of the definition of science which it set forth in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*⁶⁰ Relying greatly on philosopher Karl Popper⁶¹ and, in part, construing the federal rules of evidence⁶² the Court held that for evidence to be properly scientific the following criteria are required:

(1) Testability: "Scientific methodology today is based on generating hypothesis and testing them to see if they can be falsified, indeed methodology is what distinguishes science from other fields of human activity." Further, the statements constituting a scientific explanation must be capable of empirical test.

(2) Publication: Although not conclusive, publication in peer review journals helps insure proper methodology.

(3) The conclusions are generally accepted. This criterion is particularly important for the application of Federal Rule of Evidence 702 which may involve "technical and other specialized knowledge" where publication may be absent or rare."⁶³

Daubert also touched on predictability, that is, does the hypothesis correctly predicts results. Put otherwise, explanations and prediction share a common structure and

57. *Id.*

58. *McLean v. Ark. Bd. Of Educ.*, 529 F. Supp. 1255 (D.C. Ark 1982).

59. *Id.* at 1267.

60. 509 U.S. 579 (1993).

61. Karl Popper, *THE LOGIC OF SCIENTIFIC DISCOVERY* (Routledge Classics 2004) (1959) (He asserted that scientific laws are justified only by their resistance to falsification).

62. 116 Fed. R. Evid. 702 (1999).

63. *Daubert*, 509 U.S. at 593-94 (quoting E. Green & C. Nesson, *Problems, Cases, and Materials on Evidence* 645 (1983)).

that is that the results are explained.⁶⁴ Intelligent design theory is certainly explanatory but not falsifiable, which was central to the *McLean* court's reasoning. Notice, however, that the purpose of the definition is different. In *Daubert* the court was concerned with the admissibility of evidence for the purpose of proof. In *McLean*, Judge Overton was deciding what could be discussed in a public school science class.⁶⁵ As Ernest Nagel pointed out the "normal strategy of the natural sciences is to externalize the core of ideas of a theory from domains in which the theory has been well confirmed to another domain whose relevant features are postulated to be homogeneous with those of the former domain."⁶⁶

Microevolution⁶⁷ is a well confirmed domain, macroevolution is the domain postulated to be homogenous.⁶⁸ The fact that Darwinian mechanisms for macroevolution have not been successfully demonstrated does not mean they are false. The history of science is replete with theories, often in the form of mathematical equations that are then subjected to testing or observation in order to be confirmed or rejected.

64. Ernest Nagel, *Probability and Degree of Confirmation*, PHILOSOPHY OF SCIENCE, 253-83 (Arthur Danto and Sydney Morgenbesser, eds., 1966): "[W]e often do say that on the basis of *definite evidence* a theory has some 'degree of possibility,'" but in assessing probability of a theory scientists establish a "degree of confirmation or weight of evidence." The degree of confirmation is based on the logical structure of a theory "in order to make precise the conditions under which a theory may be confirmed by . . . experiments." The weight of evidence results from verification by experiment.

65. *McLean*, 529 F. Supp. at 1267.

66. Nagel, *supra* note 64, at 304-05; see also Jeffrey F. Addicott, *Storm Clouds on the Horizon of Darwinism: Teaching the Anthropic Principle and Intelligent Design in the Public Schools*, 63 OHIO ST. L.J. 1507, 1568-69, wherein Professor Addicott writes:

Judge Overton's simplistic definition of science has been soundly refuted by numerous legal and scientific commentators as woefully inadequate and unrealistic. For instance, because many of the giants of science came up with theories prior to empirical scientific support, their ideas would fail to satisfy Judge Overton's arbitrary third prong. Furthermore, such accepted concepts as punctuated equilibrium would equally fail to qualify as science since the idea could be interpreted as having supernatural connotations, running afoul of Judge Overton's first and second prongs. (citations omitted).

67. "Microevolution: changes in appearance of populations and species over generations." PENGUIN DICTIONARY OF BIOLOGY 219 (9th ed. 1996).

68. "Macroevolution includes large-scale phylatic change over geological time (e.g., successive origins of crossopterygian fish, amphibians, reptiles, birds, and mammals), as well as extinctions of taxa within such groups. It is usually accepted that . . . macroevolutionary change can be explained by the same factors that bring about microevolution." *Id.* Macroevolution involves "[e]volutionary change on a grand scale, encompassing the origin of novel designs, evolutionary trends, adaptive radiation, and mass extinction." CAMPBELL ET AL., *supra* note 7, at G-14. In short, macroevolutionary theory must explain the origin of new taxonomic groups (new species, new orders, new families, even new kingdoms. See *id.* at 475.

There are a number of theories which are as yet neither tested nor confirmed by observation and may, in fact, be non-testable and non-confirmable by observation, but are widely discussed because of their explanatory power. Examples include the postulated presence of a Higgs field, which has yet to be experimentally detected, and may be “responsible for many of the properties of the particles that make up . . . everything . . . we’ve ever encountered,” and including the origin of time’s arrow.⁶⁹

Judge Overton would exclude these speculations because, as yet, they are not testable against the empirical world⁷⁰ and may even lead to discussions of the strong and weak Anthropic Principles, which deal with the many peculiarities of the universe uniquely suited to the development of life.⁷¹ In fact, Judge Overton, while adopting Karl Popper’s criteria of falsification, ignores much of the rest of Popper. For example, Popper pointed out that theory comes before observation,⁷² that “the fundamental procedure of the growth of knowledge remains that of conjecture and refutation,”⁷³ that we can’t “know for sure that any of our explanatory theories are true;”⁷⁴ and that “[n]either Darwin nor any Darwinian has so far given

69. See BRIAN GREENE, *THE FABRIC OF THE COSMOS* 256-68, 275, 281-84 (Alfred A. Knopf ed. 2004). Many physicists postulate that the entire universe is permeated by an ocean of Higgs field which has a particular non-zero value related to the cosmological constant and to the newly postulated existence of dark energy and the repulsive gravitational force that drives space to expand. See also *Physicists Launch Search for the God Particle*, DISCOVER, January 2009, at 22.

70. *McLean*, 529 F. Supp. at 1267. This may change for some of these speculations due to an experiment underway using the Large Hadron Collider. See http://en.wikipedia.org/wiki/Large_Hadron_Collider. Among other things, physicists hope to prove the existence of the Higgs boson which implicates the cosmological constant.

71. The Strong Anthropic Principle (SAP) speculates that “[t]he universe must have those properties which allow life to develop within it at some stage in history.” The Weak Anthropic Principle (WAP) merely constrains whether a particular experimental observation is sensible, by requiring that the constants and laws of nature (the “rules, pieces, and initial conditions of the game”) must enable life to exist. The SAP is conducive to a religious or design inference. WAP leads to the Many Worlds inference of quantum mechanics in order to explain the many coincidences allowing for life. Robert Kaita, *Design in Physical Biology*, MERE CREATION 392-400 (William A. Dembski ed., 1984).

72. KARL A. POPPER, *OBJECTIVE KNOWLEDGE: AN EVOLUTIONARY APPROACH* 258 (1972).

73. *Id.* at 264.

74. *Id.*

an actual causal explanation of the adaptive evolution of any single organism or any single organ.”⁷⁵

Interestingly, if Judge Overton’s definition is to be taken as a constitutional mandate, recent discussions of advances in cosmology would be precluded from the classroom. This seems the very antitheses of effective pedagogy. It is the current prevailing view that the universe was created 13.7 billion years ago, that some 95% of its matter is currently undetectable, and that measurements indicate it will expand forever.⁷⁶ And sure enough, Judge Overton concluded that the sudden creation of the universe out of nothing” is an inherently religious concept.”⁷⁷

Before addressing evolutionary theory directly, some further scholarly observations of science are in order.

Thomas S. Kuhn pointed out that condition outside science influence the range of alternative explanations. Kuhn writes that “[a]n apparently arbitrary element, compounded of

75. *Id.* at 267.

76. Martin Rees & Priyamvada Natarajan, *A Field Guide to the Invisible Universe*, DISCOVER, Dec. 2003, at 42. The authors theorize that “[a]t least 96 percent of the cosmos cannot be seen The standard tools of astronomy cannot probe this dark portion [which consists of] dark matter and dark energy,” the natures of which are subject to conjecture. Can this not be critically discussed in science class? What is fact and what is inference. See Michale D. Lemmick, *Before the Big Bang*, DISCOVER, Feb 2004, at 36. Presumably this bit of speculation by cosmologists Paul Steinhardt and Neil Turok about the origin of the visible universe as a result of one of a series of infinite collisions is acceptable speculation. Unlike the traditional “Big Bang” theory which theorizes that both time and space had a beginning it has not been endorsed by Pope Pius XII and it does not seem to confirm the first few sentences of Genesis. See also Royal Martin Rees, *Why is there Life?*, DISCOVER, Nov. 2000, at 64 (suggesting that the “shockingly unlikely presence of life may be explained if there are an infinite number of universes.) See also H. Wayne House, *Darwinism and the Law: Can Non-Naturalistic Scientific Theories Survive Constitutional Challenge?*, 13 REGENT U.L. REV. 355, 412-18 (2001) wherein he quotes cosmologist and atheist Frank Tipler:

The sections of the opinion on cosmology make amusing reading for cosmologists. The 1981 Arkansas equal time law defined “creation-science” as “science” that involved, among other things, “sudden creation of the universe, energy, and life from nothing.” The judge through such an idea inherently unscientific The problem with this is that . . . the standard big bang theory has the Universe coming into existence out of nothing, and cosmologists use the phrase “creation of the universe” to describe this phenomenon. Thus if we accepted Judge Overton’s idea that creation out of nothing is inherently religious, and his ruling that inherently religious ideas cannot be taught in public educational institutions, it would be illegal to teach the big bang theory at state universities.

Id. at 415 (quoting Frank J. Tipler, *How to Construct a Falsifiable Theory in Which the Universe Came into Being Several Thousand Years Ago*, 2 PHIL. OF SCI. ASS’N. 873, 893-94 (1984) (citations and emphasis omitted)).

77. *McLean*, 529 F. Supp. at 1266.

personal and historical accident, is always a formative ingredient of the beliefs espoused by a given scientific community at a given time.”⁷⁸ In other words, view point discrimination is endemic. The current inordinate fear of traditional religion exhibited by those in control of social and cultural legislation, that is, the courts and the courts willingness to usurp administrative functions in schools by micromanaging even what is permitted to be said, probably makes it impossible to discuss any currently considered comprehensive alternative theory to the exclusion of or as the sole alternative to Darwinian Orthodoxy (for example, intelligent design), hence, the suggestion by Jay D. Wexler that the evolution–intelligent design controversy be taught in social science classes is appropriate.⁷⁹

Publication and general acceptance as pointed out in *Daubert* should not be determinative since “[n]ormal science . . . suppresses fundamental novelties because they are necessarily subversive of its basic commitments.”⁸⁰ The typical scientist develops tests and procedures designed to ratify the prevailing explanations and might even ignore or reject results that call the prevailing explanation into question.⁸¹

Using Kuhn’s formulations, the orthodox Darwinian theory has achieved the status of a paradigm. Scientists do not renounce a paradigm even “when confronted by . . . severe and prolonged anomalies” until “an alternative candidate is available to take its place.”⁸² Put aside intelligent design theory since, whatever its explanatory power, its primary effect in the classroom is likely the advancement of religious belief or, at least, non-material causation. Although the teaching of intelligent design might conceivably have a secular purpose, the Supreme Court regards the public school classroom as an

78. THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* XII (3d ed. 1996).

79. Jay D. Wexler, *Darwin, Design, and Disestablishment: Teaching the Evolution Controversy in Public Schools*, 56 VAND. L. REV. 751, 776-79 (2003).

80. “Normal science” means “research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice.” KUHN, *supra* note 78, at 10.

81. “Nor do scientists normally aim to invent new theories, and they are often intolerant of those invented by others. Instead, normal scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. *Id.* at 24.

82. *Id.* at 77.

effectively coercive setting. An Establishment Clause violation does not require coercion as an essential element, but it is sensitive to the circumstance and context of a particular challenged practice.⁸³

A well-known example of the limiting effect of a paradigm involved Albert Einstein and the general theory of relativity, which as originally formulated implied that the universe was expanding and may have had a beginning (inescapable religiosity in Judge Overton's formulation). Einstein could not accept this. The then-current paradigm held that the universe was eternal and in a steady state, that is, fixed and uniform over a large scale. To "correct" his equations, Einstein fudged a cosmological constant by arbitrarily establishing its value. Later, as evidence of an expanding universe mounted, Einstein's original value was rejected, even by him.⁸⁴

The inherent conservatism of science and the resistance of those supporting a current paradigm to new ideas or even evidence questioning the basis of the paradigm are also illustrated by these relatively recent controversies.

The first involved Barbara McClintock who posited the existence of transposons or transposable elements. These are DNA sequences which are copied and inserted elsewhere in the genome. Her theory was subject to attack because the prevailing view of mutation was a change in codon sequence (point mutations) followed by its deletion or fixation through natural selection. She was proven correct and won the Nobel Prize some 20 years later.⁸⁵ Now many different types of mutations are recognized, including point mutations (substitution of a base pair for another in the DNA sequence), insertions and deletions of nucleotides, chromosome number alteration and inversion, translocations (breaks in a chromosome) and insertions of extraneous genetic material.

83. *Sch. Dist. Of Abington Twp. v. Schempp*, 324 U.S. 203, 223 (1963); *Lynch v. Donnelly*, 465 U.S. 668, 679 (1984).

84. GREENE, *supra* note 69, at 274-79 (2004).

85. Barbara McClintock of the Cornell Faculty won the Noble Prize in Physiology or Medicine in 1983. "During the fifties and sixties, when she was doing her most original work, she was ignored to such an extent that she did not even want to publish. From time to time, her morale was low, even though she was utterly confident of her most important discovery: the mobility of genetic elements [transposons]" Howard Green, *In Memoriam: Barbara McClintock*, June 12, 1999, available at http://nobleprize.org/noble_prizes/medicine/articles/green/index.html.

A second paradigm shift, which “touched off a vigorous, sometimes acrimonious controversy over fundamental principles as well as experimental data,”⁸⁶ involved the chemiosmotic hypothesis, which was a “radical alternative to the biochemical wisdom of the day” that energy production in cells was a result of chemical linkages. The “chemiosmotic hypothesis was truly a revolutionary notion in Thomas Kuhn’s sense”⁸⁷ suggesting that the mechanism of energy production was essentially an electromotive force. This hypothesis is now totally accepted.

What then is science? It is perhaps more relevant to ask what are the concerns of science? To quote Ernst Nagel

“they are problems relating to procedures and measurements; those concerned with the logical principles involved in the assessment of the evidence and in the acceptance of the conclusions (e.g., problems relating to canons of probable inference); and those concentrating on the structure of the ideas imbedded in scientific conclusions as well as of the systems of statements to which the conclusions belong (e.g., problems relating to the character of scientific explanations or to the role of theories).”⁸⁸

And Darwinian Orthodoxy relies on inferences preserving material causation, randomness, and purposelessness.

In summarizing Bertrand Russell’s philosophy of science, Nagel states that in order to obtain a secure foundation for knowledge we must therefore separate out those beliefs which are “inferred” from or “caused” by other beliefs from the beliefs which are both logically and psychologically prior to all others. The “hardest” or “most certain” of all data (that is which “resist the solvent influence of critical reflection”) are the truths of logic and the particular facts of [the crude materials] of sense.”⁸⁹ This is not to say that an inference that an event occurred is less certain than the evidence for it, assuming those evidentiary pieces are independent or that rational explanations are necessarily adequate for predictions.⁹⁰ Or, to

86. HAROLD, *supra* note 21, at 84.

87. *Id.* at 83.

88. Ernest Nagel, *Preface*, PHILOSOPHY OF SCIENCE 13 (Arthur Danto and Sydney Morgenbesser, eds., 1960).

89. *Id.* at 55-68.

90. Israel Schaffer wrote: “[E]xplanations are true, predictions need not be; making predictions is part of one way of confirming the existence of explanations; predictions may be made with or without rational grounds, and some rational grounds

paraphrase Richard Feynman, the imagination of a scientist is chained to experimental facts, and theories, and no matter how rationally coherent they seem, must be abandoned if contradicted by newly discovered facts.⁹¹ This point should be remembered when as a foundation for Darwinian explanations observable phenomena are extrapolated to support macroevolutionary theory, which is, in this context, a prediction.⁹²

C. *Darwinian Orthodoxy*

As Franklin M. Harold points out, quoting Francois Jacob in part: "Scientific theories are commonly formulated with a purpose, in an effort 'to explain visible events by invisible forces, to connect what is seen with what is assumed.' Darwin's theory of evolution by natural selection is a renowned case in point."⁹³

Darwinian Orthodoxy grows out of the "Modern Synthesis"⁹⁴ established as part of the centennial celebration of the publication of *Origin of Species*.⁹⁵ This synthesis resulted

adequate for predictions fail to *explain* the predicted occurrences." *Id.* at 280. *Explanation, Prediction, and Abstraction*, in PHILOSOPHY OF SCIENCE 280 (Arthur Danto and Sydney Morgenbesser, eds. 1966).

91. See Richard Feynmann, *Cargo Cult Science*, Cal Tech Commencement Address 1974, see <http://calteches.library.caltech.edu/51/2/CargoCult.pdf>; See also Richard Feynmann, *What is Science?*, 17 THE PHYSICS TEACHER 313, 320 (1966), wherein this eminent scientist opined that:

Another of the qualities of science is that it teaches the value of rational thought as well as freedom of thought; the positive results that come from doubting that the lessons are all true . . . As a matter of fact, I can also define science in another way: Science is the belief in the ignorance of the experts . . . If they say to you, "science has shown such and such," you might ask, "How does science show it? How did the scientists find it out? . . . The experts who are leading you may be wrong.

92. *Supra* note 68 and text related thereto.

93. HAROLD, *supra* note 21, at 30 (quoting THE POSSIBLE AND THE ACTUAL, 11 (1982)).

94. "Modern Synthesis" is derived from JULIAN HUXLEY, *EVOLUTION, THE MODERN SYNTHESIS* (1942). Simply put it involves "the recognition that Mendelian principles operate in all organisms . . . ; the key insight that small scale [point mutation] continuous Darwinian variability also maintain a Mendelian basis, and the mathematical demonstration that small selection pressures acting on minor genetic differences can render evolutionary change." This replaced several competing theories with one synthesis. See STEPHEN JAY GOULD, *THE STRUCTURE OF EVOLUTIONARY THEORY* 504-05 (2002). Evolution is commonly defined simply as descent with modification.

95. CHARLES DARWIN, *ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION, OR PRESERVATION OF FAVORED RACES IN THE STRUGGLE FOR LIFE* (1859).

from the fusion of Darwin's theory with Mendelian particulate inheritance.⁹⁶ It eventually led to

an increasingly firm and exclusive commitment to adaptationist scenarios and to natural selection [operating biotically on organisms] as the virtually exclusive mechanism of change. . . . The complex reasons for this hardening include some empirical documentation of selection, but also involve a set of basically social and institutional factors not based on increasingly factual adequacy.⁹⁷

These social and institutional factors include the rise of secular world-views and the inherent conservatism of science or any area of learning with an established paradigm.

The late Stephen Jay Gould⁹⁸ famously referred to Daniel Dennett,⁹⁹ the great ally of Richard Dawkins,¹⁰⁰ as a "Darwinian Fundamentalist."¹⁰¹ This is not because Dennett and Dawkins are Darwinists and Gould was not. Rather it is based on a mindset that seems closed to anything that even implicitly questions the central, some might say sacred, tenets of the modern Darwinian synthesis that natural selection

96. Gregor Johann Mendel, an Augustinian monk, in papers published around 1860, developed the "particulate" hypothesis of inheritance, that is, parents pass on traits via discrete heritable units. See CAMPBELL, ET AL, *supra* note 7, at 239-40.

97. See discussion in GOULD, *supra* note 94, at 70-71.

98. Stephen Jay Gould was professor of geology and zoology at Harvard University from 1967 until his death in 2003. For part of that period he was curator of Harvard's Museum of Comparative Zoology. Among his publications are: EVER SINCE DARWIN: REFLECTIONS IN NATURAL HISTORY (1980); THE PANDA'S THUMB: MORE REFLECTIONS IN NATURAL HISTORY (1983) (winner of the 1981 American Book Award for Science); HEN'S TEETH AND HORSE'S TOES: FURTHER REFLECTIONS IN NATURAL HISTORY (1984); THE FLAMINGO'S SMILE (1987); TIME'S ARROW, TIME'S CYCLE (1988); AN URCHIN IN THE STORM (1989); WONDERFUL LIFE (1991) (winner of the Science Book Prize for 1990); BULLY FOR BRONTOSAURUS (1992); and EIGHT LITTLE PIGGIES (1994). His last book was THE STRUCTURE OF EVOLUTIONARY THEORY (2002).

99. Daniel Dennett is University Professor at Tufts University. He is a philosopher, scientist, and a strong proponent of the materialist view that the human mind is the result of the physical workings of the brain. He believes that the high-level consciousness of the human mind is simply the result of the Darwinian evolutionary process. His most quoted book is DARWIN'S DANGEROUS IDEA (1995), which was subject to a less than favorable review by Stephen Jay Gould.

100. Richard Dawkins is Lecturer in Zoology at Oxford University and a Fellow of New College and holder since 1995 of the Charles Simonyi Chair of Public Understanding of Science. His publications include THE SELFISH GENE (2d ed. 1989); THE BLIND WATCHMAKER (1980); THE EXTENDED PHENOTYPE (1982); RIVER OUT OF EDEN (1995); CLIMBING MOUNT IMPROBABLE (1996); and UNWEAVING THE RAINBOW (1998).

101. Ronald Bailey, *Pulling our Own Strings: Philosopher Daniel Dennett on Determinism, Human "Choice Machines," and How Evolution Generates Free Will – Interview*, REASON, May 2003 at 25.

operating on random and purposeless point mutations over long periods of time (the idea of gradualism) comprise the basic, perhaps virtually the only, explanation for macroevolution and that the evidence for microevolution may be extrapolated to provide evidence for macroevolution.¹⁰² This view has, in fact, dominated thinking about the origin of life and evolution since the publication of *Origins of Species* and is enshrined in the Modern Synthesis.

Contrary to the precepts of “normal science,”¹⁰³ however, there is a significant scientific dispute over the origin of life and the rise of new taxonomic groups. In fact, when Gould points to the “hardening” of the Modern Synthesis, he takes issue with two precepts of orthodox thought (but he most emphatically does not reject the broad conclusions of the Modern Synthesis). He states the conclusions that (1) all evolution is due to natural selection of *small* genetic changes, and (2) macroevolution as nothing but the extrapolation of microevolutionary events must be firmly rejected if macroevolutionary theory merits any independent status. The Modern Synthesis, then, does not provide a “full and exclusive explanation of macroevolutionary phenomena”¹⁰⁴ Gould does not say that the Modern Synthesis is wrong; he claims it is insufficient.

Alternative definitions of evolution, some of which include Darwinian mechanisms exist. One biology text states that “evolution refers to the process that has transformed life on

102. See GOULD, *supra* note 94, at 14-16. Microevolution deals with variation within a basic body plan. Often defined as a generation to generation change in a population's alleles [different versions of the same gene] or genotypic frequencies.

103. KUHN, *supra* note 78. “Normal Science” is defined as “research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice, the study of which becomes a paradigm.” A paradigm arises from an achievement “sufficiently unprecedented to attract an enduring group of adherents away from competing modes of scientific activity . . . while being “sufficiently open-ended to leave all sorts of problems” unresolved. *Id.* at 10.

104. GOULD, *supra* note 94, at 1004. Motoo Kimura, a population geneticist, asserts that random drift not Darwinian selection causes the great majority of evolutionary changes at the molecular level. See MOTOO KIMURA, *THE NEUTRAL THEORY OF MOLECULAR EVOLUTION* 34 (1983). Kimura wrote (while not rejecting the Neo-Darwinian synthesis) that “in sharp contrast to the Darwinian theory of evolution by natural selection, the neutral theory claims that the overwhelming majority of evolutionary changes at the molecular level of random fixation . . . are of selectively neutral . . . mutants under continued inputs of mutations.” *The neutral theory of molecular evolution: A Review of Recent Evidence*, JAPANESE JOURNAL OF GENETICS 367(1991) (quoted in GOULD, *supra* note 94, at 686).

Earth from the earliest form to the vast diversity that characterize it today" apparently minimizing the fact that virtually all phyla appeared at approximately the same time during what is known as the Cambrian Explosion some 500 million year ago.¹⁰⁵ The most general definition of evolution is descent with modification, a definition that encompasses both macro and microevolution.¹⁰⁶

Other definitions more explicitly incorporate some of the very assumptions that are increasingly at issue. For example, evolution is often defined as descent with modification over time by a gradual accumulation of adaptations to a different environment.¹⁰⁷ Another definition states that evolution encompasses, "all changes that have transformed life on Earth from its earliest beginnings to the diversity that characterizes it today."¹⁰⁸ NASA even defines life both as a reductionist process and in terms of Darwinian evolution stating that, "[l]ife is a self-sustained chemical system capable of undergoing Darwinian evolution."¹⁰⁹

The definition adopted by the Supreme Court in *Edwards v. Aguillard* is that evolution is "the theory that the various types of animals and plants have their origin in other preexisting types, the distinguishable differences being due to modifications in successive generations."¹¹⁰ Another definition is that evolution is a change in gene frequency or the frequency of alleles (variations of a gene).¹¹¹ Because the science of

105. "[A]ll major bilaterian phyla [with the exception of the bryozoa] with conspicuously fossilizable hard parts make their first appearance in the fossil record within a remarkably short interval (5-10 million years, but probably near or below the lower value "of the so-called Cambrian explosion (535-525 million years ago)." Although there is a lack of fossils certain biologist postulate much earlier appearances of at least some of the phyla. See GOULD, *supra* note 94, at 1155. Further the results of studies of the genetic basis for the major developmental patterns (evo-devo or evolution of development) document the presence of *Hox* genes suggesting that diversification during the Cambrian explosion came from the realization of potentials already present. See GOULD, *supra* note 94, at 1056, 1143. *Hox* genes are defined as a subset of homeogenes (possibly of universal occurrence), encoding positional information. PENGUIN DICTIONARY OF BIOLOGY (9th ed. 1996).

106. CAMPBELL ET AL, *supra* note 7, at 419.

107. *Id.*

108. *Id.*

109. G.F. JOYCE, *FORWARD, ORIGINS OF LIFE: THE CENTRAL CONCEPTS* XI-XII (1994). This definition not only incorporates Darwinian assumptions but is reductionist in the extreme.

110. *Edwards v. Aguillard*, 482 U.S. 578, 599 (1983) (citing WEBSTER'S THIRD INTERNATIONAL DICTIONARY 789 (1981).

111. RODERICK D.M. PAGE AND EDWARD C. HOLMES, *MOLECULAR EVOLUTION: A*

molecular evolution deals with evolutionary information written into genes, evolution might be defined as changes in the structure of deoxyribonucleic acid (DNA).¹¹² Most non-creationist theories include a Theory of Common Descent from one or sometimes more types.

A neutral definition of evolution might simply state a fact – evolution is the process by which new life forms appear in and disappear from the fossil record. This avoids speculative language about the origin of life, the Darwinian mechanisms at issue, and the ideological baggage inferred from Darwinian Orthodoxy.

Gould distills Darwinian evolutionary theory as based on Darwin's insight that natural selection is the engine of evolutionary change. It may be understood as involving the operations of small selection pressures acting on minor genetic differences. In Gould's summary, the three tenets of the "central logic" of Darwinian natural selection start with adaptationist pressure operating on heritable variations as the *agency* of evolution. The *efficacy* of natural selection as the mechanism is demonstrated by its operation over time on genetic variations among over produced offspring. Its *scope* may be extrapolated from the evidence for microevolution.¹¹³ Extrapolation is, of course, defined as the process wherein an unknown value is inferred from known facts.

Gould tweaks or corrects the Modern Synthesis while chiding those like Dawkins who maintain an essentially fundamentalist view. Gould argues "that modern debates have developed important and coherent auxiliary critique on all three branches of essential Darwinian logic, and that these debates may lead to a fundamentally revised evolutionary theory with a retained Darwinian core."¹¹⁴

But, as Gould points out, if any correction does not involve an abandonment of any part of the central logic, then Darwinian Theory remains essentially intact and there is no paradigm shift. For example, Gould and Eldredge, in order to explain a fossil record characterized by stasis rather than gradual change developed the theory of punctuated equilibrium

PHYLOGENETIC APPROACH, 124-25 (2005).

112. DNA is chemical polymer forming the genetic material that transmits information. See CAMPBELL, ET AL., *supra* note 7, at 7.

113. GOULD, *supra* note 94, at 125-163.

114. *Id.* at 12-24.

based on their observation of the fossil record and were much criticized by the orthodox for their trouble.¹¹⁵ Yet such a theory does not directly challenge Darwin's central logic, although it certainly weakens the argument for gradualism.

Gould also posits the necessity of isolated populations. Yet in their commentary on natural selection Page and Holmes conclude

In sum, we can see that natural selection operates most efficiently when there are large amounts of genetic variation for it to work with. Furthermore, the efficiency of natural selection is also determined by the size of the population, working best when it is large. When population sizes are small, mutations are more under the control of chance processes.¹¹⁶

However, Jerry Foder states:

[i]n fact, an appreciable number of perfectly reasonable biologists are coming to the conclusion that the theory of natural selection can no longer be taken for granted. . . . The breaking news, however, is that serious alternatives to adaptationism have begun to emerge; ones that preserve the essential claim that phenotypes evolve, but depart to one degree or other from Darwin's theory that natural selection is the mechanism by which they do."¹¹⁷

Dr. Rhawn Joseph theorizes that DNA contains a timing mechanism, that is, evolutionary change is pre-timed or built into the DNA.¹¹⁸ In support of this he points to the "junk DNA"¹¹⁹ found in all organisms and the fact that simpler

115. See, e.g., John Tooby & Leda Cosmides, Letter to the Editor of *The New York Review of Books* on Stephen Jay Gould's "Darwinian Fundamentalism" (June 12, 1997) and "Evolution: The Pleasures of Pluralism" (June 26, 1997) of the Center for Evolutionary Psychology, USCB, July 7, 1997, available at http://www.cogweb.ucla.edu/Debate/CEP_Gould.html; John Alcock, *Misbehavior*, available at <http://www.bostonreview.net/BR25.2/alcock.html>.

116. PAGE & HOLMES, *supra* note 111, at 105-06.

117. Jerry Foder, *Why Pigs Don't Have Wings*, LONDON REVIEW OF BOOKS, Oct. 18, 2007.

118. *Id.* at 153-157. Note the presence of homeogenes discussed *supra* note 105, hints at this. In fact, Gould observes: "[t]he punctuational character of the Cambrian explosion seems far easier to understand if the basic regulatory structure already existed in ancestral homonomous taxa, and the subsequent diversification . . . therefore marks the speciation and regionalization of potentials already present". GOULD, *supra* note 94, at 1143.

119. "Junk" DNA may be thought of as "non-coding segments of nucleic acid that lies between coding sections" or introns as opposed to exons. CAMPBELL ET AL., *supra* note 7, at 302; see also GOULD, *supra* note 94, at 1269-1270.

organisms often have more DNA, as measured by the number of base pairs or genes, than more complex organisms.¹²⁰ A theory of human evolution that modern humans arose simultaneously in different parts of the world¹²¹ gives credence to a timing mechanism and, parenthetically, to at least the incompleteness of Darwinian macroevolutionary theories.

Recent research points to an evolutionary role for endogenous retroviruses (ERV).¹²² These retroviruses have their genetic information coded in ribonucleic acid (RNA) rather than DNA. This RNA acts like messenger RNA¹²³ and is copied into the double stranded DNA of a host's chromosome contained in the ovum or sperm cell by an enzyme called reverse transcriptase. In this way, the protein coded for becomes part of the offspring's genetic inheritance. These ERVs may be harmful, create junk DNA or effect gene regulation in ways not selected for that create internal developmental pathways hinting at saltationism.¹²⁴

120. In DISCOVERY, Jan. 2003, at 1, there is a story referred to as number 72 of the Top Science Stories of 2002 called "Count Your Genes," where in the author reports that biologists sequencing genomes found that "[t]he number of genes that an organism has bears little relation either to the number of base pairs – the complementary chemical unites within the DNA helix – in its genome or to complexity" Examples given include:

Organism	No. of Base Pairs (in millions)	Approx No. of Genes
Amoeba	670,000	unknown
Wheat	16,000	50,000
Human	3,100	30,000
Puffer Fish	365	31,000
Rice	420	50,000
Bullfrog	6,900	unknown

This information raises certain questions such as the following: Do more highly evolved organisms lose DNA? Since a codon equals three base pairs, what is the function of all that "junk" DNA? These questions have not been answered.

121. Alan G. Thorne & Milford H. Wolpoft, *The Multiregional Evolution of Humans*, SCIENTIFIC AMERICAN, Special ed., Aug. 25, 2003, at 46.

122. See <http://vwxynt.blogspot.com/2007/06/endogenous-retrovirus-and-evidence.html> and references therein.

123. PAGE & HOLMES, *supra* note 111, at 38-39. Messenger RNA carries codes for protein from the DNA to the ribosome.

124. See GOULD, *supra* note 94, at 12. Gould's position is that the "essence of Darwinian logic can be defined...by specifying a set of minimal commitments or broad statements so essential to the central logic . . . the disproof of any item will effectively destroy the theory". He suggests that there are three alternative explanations that would destroy the Darwinian core. They are Lamarckism as a substitute functionalism or saltation or orthogenesis as formalist alternatives. Briefly Lamarckism holds that the flow of information from the environment to the organism is the primary basis of adaptive transformation; *Id.* at 70, 176-79 saltationist theories hold that variations are correlated within the organism itself. *Id.* at 70, 396-415, 1142-47. And Orthogenesis is a theory that evolutionary change proceeds along defined and restricted pathways

Dawkins most quoted book is probably "The Selfish Gene"¹²⁵ wherein he advances his theory that natural selection acts on genes insuring the survival of the fittest gene lineages through the organisms which contain them. He is a philosophical materialist committed to a deterministic and reductionist view of physical processes. As a reductionist, he believes that the properties of a complex system, such as a cell, can be largely or wholly understood in terms of its simpler parts, that is, the molecules that make up the whole.

Franklin Harold is not so sure. A cell has structure and purpose (it performs functions) that cannot be explained by simply knowing the chemistry of its constituent molecules.¹²⁶ "Homeostasis, internal regulation by an organism, purposeful behavior, reproduction, morphogenesis, and descent with modifications are not part of the vocabulary of chemistry but point to higher levels of order."¹²⁷

Interestingly enough, however, in an interview contained in one of the leading biology textbooks, wherein Dawkins attempts to explain certain aspects of human behavior, he states "[u]sing language and culture, humans have formed societies in which there is something *like* Darwinian evolution going on, though it is *not really* Darwinian"¹²⁸ (emphasis added). Gould would not fall into such a logical inconsistency since, he, unlike Dawkins, is not a strict adaptationist nor is he a reductionist.

Of course, natural selection can only act on the variations within a population that exist at a given moment. According to Gould,

Darwin reasoned natural selection can only play [a creative role] if evolution obeys two crucial conditions (1) if nothing about the provision of raw materials – that is, the sources of variation—impart direction to evolutionary change; and (2) if change occurs by a long and insensible series of intermediate steps, each superintended by natural selection so that creativity or direction can arise by the summation of increments.

because factors internal to the organism limit and bias variations into specified channels *Id.* at 70, 351-55, 1142-47.

125. RICHARD DAWKINS, *THE SELFISH GENE* (1989).

126. HAROLD, *supra* note 21, at 65.

127. *Id.*

128. CAMPBELL ET AL., *supra* note 7, at 412.

As Gould points out, if natural selection is neither an actual nor a creative process, extrapolation has no explanatory role, and Darwinian Orthodoxy fails as a theory of evolution.¹²⁹

Gould's revisions to Orthodoxy, designed to establish a correlation between theory and logical inference, may be summarized as follows: (1) Isolated populations are likely necessary for natural selection to be creative rather than conservative; (2) Stasis not gradual change is characteristic of the fossil record, and (3) Structural, historical and developmental constraints channel the pathways of evolution negating the pure functionalism of a strictly Darwinian (and externalist) approach to adaptation.¹³⁰

Thus Gould's and Eldredge's hypothesis of "punctuated equilibrium"¹³¹ arises. Extrapolation, is rejected as a complete explanation that,

can render the entire panoply of phenomena in life's history without adding explicitly macroevolutionary modes for distinctive expression of these processes at higher tiers of time – as in the explanation of cladal trends by species sorting [rather than organism reproduction] under punctuated equilibrium, rather than by extended adaptive anagenesis of purely organismal selection, and in the necessity of titrating adaptive microevolutionary accumulation with occasional resetting of rules and patterns by catastrophically triggered mass extinctions at time's highest tier.¹³²

In other words, the rise of new taxonomic groups could be constrained by preexisting structures and be relatively rapid, following mass extinctions triggered by environmental catastrophe thereby, at least partially, accounting for the lack of gradual changes found in the fossil record.

After all these years of fossil discoveries it is very difficult to blame an incomplete fossil record for the lack of transitory forms as the great biologist George Gaylord Simpson once pointed out.¹³³ Yet, the evolution of horses is often said to be an example of macroevolutionary gradualism. The 35 million year

129. *Id.* at 12-24.

130. *Id.* at 12-33, 53-58.

131. GOULD, *supra* note 94, at 755-57, 971. Gould discusses how punctuated equilibrium and natural selection may be viewed as consistent.

132. *Id.*

133. *Id.* at 755 (quoting George Gaylord Simpson, *The History of Life*, in 1 EVOLUTION AFTER DARWIN: THE EVOLUTION OF LIFE 117, 149 (Sol Tax ed. 1960)).

progression starts with *eohippus* (*Hyracotherium*), and progresses through *mesohippus*, *parahippus*, *merychippus*, *pliohippus* and *equus* (modern horse genus). The problem is the fossil record is devoid of any evidence of organisms that show gradual change between any of the pre-*equus* forms let alone any intermediate forms demonstrating gradualism from an ancestral condylarth to *eohippus*. As Professor Savage wrote "[t]he brain of [*eohippus*] is vastly different from that of a condylarth"¹³⁴ A chart comparing key characteristics of the various discrete species of pre-modern horse ancestors illustrates not gradualism but significant morphological differences.¹³⁵

The aforementioned George Gaylord Simpson might have explained this as a result of non-adaptationist genetic drift followed by rapid anagenesis (the transformation of one ill-adapted species into a new presumably better adapted species). To quote Henry Gee, Senior Editor Biological Science for *Nature*, "[t]o take a line of fossils and claim that they represent a lineage is not a scientific hypothesis that can be tested, but an assertion that carries the same validity as a bedtime story—amusing, perhaps even instructive, but not scientific."¹³⁶

One does not have to believe in intelligent design in any of its manifestations to question whether the Modern Synthesis satisfactorily explains the appearance of new taxonomic groups or whether the Darwinian mechanism of Natural Selection explains evolution. Thus far I have briefly discussed Gould's revisions and certain other critiques which can and sometimes do lead to non-Darwinian inferences. Other prominent scientists, many of whom are not associated with the intelligent design movement have expressed serious misgivings

134. R.J. SAVAGE AND M.R. LONG, *MAMMAL EVOLUTION: AN ILLUSTRATED GUIDE* (Facts on File and the British Museum 1986). Savage is professor of Vertebrate Paleontology, Department of Geology, University of Bristol, England.

135. *Id.* at 200-01.

136. HENRY GEE, *DEEP TIME: CLADISTICS, THE REVOLUTION IN EVOLUTION* 114 (2001). I do not suggest that Gee does not believe in evolution from a common ancestor. He is a proponent of cladogenesis which infers common ancestry from the common presence of innovations. If two species have a common trait (molecular or morphological, for examples) then the principle of parsimony rules out independent creation for that trait. Cladistics, therefore, is a method for inferring the most probable history of evolutionary branching for a group of related organisms given a list of their observable attributes and characteristics (innovations). This does not, however, explain the presence of homologies in otherwise completely unrelated organisms.

about whether the Darwinian mechanism explains what it purports to explain.

D. Current Case Law

The U.S. Supreme Court recently reaffirmed that the “touchstone” for Establishment Clause Analysis is “that the First Amendment mandates governmental neutrality between religion and religion, and between religion and non-religion.”¹³⁷ Whether the court really meant what it reiterated is another question. The court often states that each case must be decided on its facts.

The Court variously applies one or more prongs of the test set forth in *Lemon v. Kurtzman*¹³⁸ (purpose, effect, entanglement) or the endorsement test¹³⁹ or a combination of the two. However, in light of the disability of religious free speech in certain circumstances involving the government, neutrality is sometimes hard to find. This is especially true in a closed forum situation such as a public school. Whether a court will find a violation of any of the Establishment Clause tests depends not only on the content but also on the context and the audience. Context may mean the sequence of events including incidents that illuminate the motivation of the individuals involved that leads a court to find a constitutional violation or the setting or location of the alleged violation. In applying both the endorsement test and effects prong of the *Lemon* test, the court “asks whether a reasonable observer familiar with the history and context” of the government’s act would perceive the act as a government endorsement of religion”¹⁴⁰ or, in the case of Darwinism, non-religion.

“Neutrality” is redefined by the ACLU’s insistence that students *must* be taught that life as we know it evolved through happenstance, a conclusion that certain scientists who do not advocate intelligent design or creationism take issue with. The ACLU confuses neutrality with motivation and

137. *McCreary County v. ACLU*, 545 U.S. 844, 860 (2005) (citing *Epperson v. Arkansas*, 393 U.S. 97, 104 (1968)).

138. 406 U.S. 602 (1971).

139. *County of Allegheny v. ACLU Greater Pittsburgh Chapter*, 492 U.S. 573, 585 (1989).

140. See *Modrovich v. Allegheny County*, 385 F.3d. 397, 401 (citing *Lynch v. Donnelly*, 465 U.S. 92) (O’Connor J., concurring) (explaining that the endorsement test asks whether the government action has “the effect of communicating a message of government endorsement or disapproval of religion.”) (emphasis added).

subsumes both within secular purpose, logically extending *Allegheny*¹⁴¹ and *Lee v. Weismann*.¹⁴² Support for this view is found in *McCreary*, where despite the ultimate courthouse display which contained numerous documents that had influenced the development of the law and which had been modified in reaction to an earlier lawsuit, the Court struck down the display including the Ten Commandments, because of the original, known motivation of the supporters of the display.¹⁴³

The Court then made plain that it viewed the Constitution as mandating a government that must remain secular, holding that a crèche displayed on government property was unconstitutional but reasoning that Christmas and Chanukah symbols could remain if their effect was to celebrate both as secular holidays. The purpose of such displays is, according to the Court, secular, as was the Ten Commandments monument at issue in *Van Orden v. Perry*¹⁴⁴ based on its passivity, history of how it came to be and longevity.¹⁴⁵

The purpose of mandating the teaching of intelligent design as an alternative to Darwinian Orthodoxy is an affirmative act and held to be religious, despite the evidentiary claims of its proponents. *Lee* would preclude the subtle and indirect pressure resulting from mandating only a choice between Darwin and intelligent design. This dichotomy is exactly what the ACLU claims in *Selman* based largely on affidavits characterized as “untrustworthy evidence”¹⁴⁶ But this misses the point. Criticisms of Darwinian Orthodoxy, particularly of the concepts of extrapolation and purposelessness, do not necessarily stem from religious motivation nor from any rejection of material causation.

On the other hand, unlike *Selman*, *Kitzmiller* did effectively set up a dichotomy. If “neutrality” as a constitutional concept is to be taken seriously, the issue should not be one of motivation but of endorsement of a particular religious or worldview that

141. *Supra* note 139.

142. 505 U.S. 577 (1992).

143. *McCreary*, 545 U.S. at 864-865.

144. *Van Orden v. Perry*, 545 U.S. 677 (2005).

145. *Allegheny*, 492 U.S. at 612-16; *Van Orden*, 545 U.S. at 701-704.

146. *Selman v. Cobb County Sch. Dist.*, 390 F. Supp. 2d 1286 (2005), opinion vacated and remanded for additional evidentiary findings, 449 F.3d 1320 (11th Cir. 2006). Order of the Court at ¶ 12.

arises inferentially from the evidence.¹⁴⁷ Looked at this way, those effectively demanding an endorsement of Darwinian Orthodoxy with all its philosophically materialist baggage are the parties constitutionally wrongheaded – a wrong headedness that seems to arise from a fear of religious inference, particularly by the young subjected to the alleged “coercive” environment of a classroom. Is it really less coercive to require students, for grades, to accept uncritically Darwinian Orthodoxy then to allow a discussion of various theories advocated by eminent scientists that raise questions about the complete explanatory power of Darwin’s theory?

Both *Selman* and *Kitzmiller* seem consistent with *McCreary* in their preoccupation with motivation. The “manifest objective [of the government] may be dispositive of the constitutional enquiry.”¹⁴⁸ *McCreary* was distinguished from *Van Orden* on the basis that placement of the Ten Commandments in *Van Orden* was found to be passive. Based on *McCreary* and *Van Orden* the finding of a secular purpose for a religious symbol is coupled with either a concept of historical existence robbing the symbol of genuine religious meaning or passivity, that is, a lack of endorsement of that symbol or its religious significance, like Christmas trees and Santa Claus. In explaining the difference between endorsement and passivity or secular purpose the Court stated:

Indeed, the purpose apparent from government action can have an impact more significant than the result expressly decreed: when the government maintains Sunday closing laws, it advances religion only minimally because many working people would take the day as one of rest regardless, but if the government justified its decision with a stated desire for all Americans to honor Christ, the divisive thrust of the official action would be inescapable. This is the teaching of *McGowan v. Maryland*, 366 U.S. 420, 81 S. Ct. 1104, 6 L.Ed. 2d 393 (1961), which upheld Sunday closing statutes on practical, secular grounds after finding that the government had forsaken the religious purposes behind centuries old predecessor laws. *Id.* at 449-451, 81 S. Ct. 1101.¹⁴⁹

147. See *Santa Fe Indep. Sch. Dist. v. Doe*, 530 U.S. 290, 319 (2000), (Rehnquist, C.J., dissenting) (where the Court, according to the dissenting justices, applied the “most rigid version” of the *Lemon* test rather than the endorsement test).

148. *McCreary*, 545 U.S. at 850-51.

149. *Id.* at 860-61.

Based on the history and context of the placement of the Ten Commandments in *McCreary* the Court concluded that the government's actions amounted to endorsement.¹⁵⁰ In returning to its interpretation of *Lemon* the court opined "that government action must have a secular . . . purpose, . . . and after a host of cases it is fair to add that although a legislature's stated reasons will generally get deference, that secular purpose required has to be genuine, not a sham, and not merely secondary to a religious objective."¹⁵¹

The reasonable observer must not perceive that government is taking sides. It is not accuracy of the message that counts, rather "where one display has a history manifesting sectarian purpose that the other lacks," that requires the court to treat the same government action differently.¹⁵² Delving into mind reading the courts conclude that the question of constitutionality is determined by the perception of the reasonable observer who views a display or, for that matter, reads a textbook or sticker. What that viewer, in the opinion of a court, fairly understands is the purpose of the display is a crucial issue, perhaps the crucial issue.¹⁵³

In *Cornelius v. NAACP Legal Defense and Education Fund, Inc.*,¹⁵⁴ the court pointed out that regulation of speech in a "nonpublic forum can be based on subject matter . . . so long as the distinctions drawn are reasonable in light of the purpose served by the forum and are viewpoint neutral" and a distinction is viewpoint based if it "denies access to a speaker solely to suppress the point of view he espouses."¹⁵⁵ Is there really any doubt that religious free speech is disabled both by the Court's preoccupation with the motivation of those who wish changes in the public school biology curriculum and its expansive reading of the Establishment Clause? Despite the ACLU and consistent with current scientific controversies no one should be permitted to "prescribe what shall be orthodox in politics, nationalism, religion, or other matters of opinion" or even scientific theory.¹⁵⁶ Thus, the immiscibility of the

150. *Id.*

151. *Id.* at 864.

152. *Id.* at 866.

153. *See Allegheny* 492 U.S. at 595.

154. 473 U.S. 788, 806 (1985).

155. *Id.*

156. *West Virginia State Bd. Of Educ. v. Barnette*, 319 U.S. 624, 638 (1943). The Court also said that "[p]robably no deeper division of our people could proceed from any

adversarial system and scientific inquiry cannot be better illustrated than in the ACLU's national campaign to enshrine Darwinian Orthodoxy. It is no less wrongheaded than the Roman Catholic Church's alleged attempt to enshrine the Copernican theory, which replaced the Ptolemaic system, in the face of Galileo's challenge.¹⁵⁷

III. SELMAN AND KITZMILLER

A. Summary

The *Selman* and *Kitzmiller* opinions have been the subject of a number of law review comments and articles, all of which neglect a careful analysis based upon the actual science rather than relying on ideological driven agendas.

The plaintiff in *Selman* objected to the following language placed in the biology text books as unconstitutional:

This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered" [hereinafter Sticker].

This language was alleged to be objectionable because certain members of those on the school board who singled out evolution forthrightly stated their belief in a Supreme Being, received material on intelligent design, and the quoted language could infer that "life has evolved not though happenstance, but in a purposeful way."¹⁵⁸

In *Kitzmiller*, the district court found evidence of religious endorsement because the teaching of Darwin's Theory of Evolution was accompanied by the following pronouncement:

The Pennsylvania Academic Standards require students to learn about Darwin's Theory of Evolution and eventually to take a standardized test of which evolution is a part.

provocation than from finding it necessary to choose what doctrine and whose programs public educational officials shall compel youth to unite in embracing." *Id.* at 642 (Jehovah's Witnesses were relieved from the obligation of saluting the flag).

157. KUHNS, *supra* note 78, at 67-73.

158. *Selman v. Cobb County Sch. Dist.*, 390 F. Supp. 2d 1286 (2005), opinion vacated and remanded for additional evidentiary findings, 449 F.3d 1320 (11th Cir. 2006) and *Kitzmiller v. Dover Area Sch. Dist.*, 400 F. Supp. 2d 707 (2005).

Because Darwin's Theory is a theory, it continues to be tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as well-tested explanation that unifies a broad range of observations.

The evolutionary theory questioned in both cases was Darwin's as enshrined in the Modern Synthesis, implicitly in *Selman* as recognized by the court and explicitly in *Kitzmiller* as set forth in the disclaimer.

The *Kitzmiller* court, ignoring the scientifically based critiques and questions about Darwinian Orthodoxy and its own statements about the inability of scientists to "explain today how biological systems have evolved," their inability to "explain every evolutionary detail"¹⁵⁹ and "real gaps in scientific knowledge [about evolutionary theory],"¹⁶⁰ found the disclaimer unconstitutional because it "undermines student's education in evolutionary theory" It suggests "to the informed, reasonable observer that evolution is only a highly questionable opinion or a hunch," that it "singles out evolution from the rest of science . . . and informs students that evolution, unlike anything else that they are studying is 'just a theory.'"¹⁶¹

B. *The Selman Decision*

The logical inconsistency of the *Selman* decision did not prevent the Northern District Court of Georgia from finding the Sticker at issue unconstitutional although the Eleventh Circuit has remanded it for certain factual findings.¹⁶²

Part of the problem lies with the language of the Sticker itself, which fails to define evolution.¹⁶³ It is unclear whether the Sticker references the origin of life, the development of the diversity of life, or the Darwinian mechanisms used to explain the diversity of life and the rise of new taxonomic groups. Although the presence of diverse life forms currently and in the fossil record is a fact, the mechanism(s) explaining such diversity are increasingly at issue.

159. *Id.* at 738.

160. *Id.* at 742.

161. *Id.*

162. *Id.*

163. See *infra* text accompanying note 188.

The district court applied the three prongs of the *Lemon* test,¹⁶⁴ finding no violation of the first prong which requires a “clearly [but not exclusively] secular purpose.”¹⁶⁵ In this the court relied on the text of the Sticker and the testimony as to the motivation of the school board members.¹⁶⁶ The last, of course, invites the very process of viewpoint discrimination forbidden by the courts to other branches of government.¹⁶⁷

The court, however, found a violation of the second prong of the *Lemon* test, holding that “the chief purpose of the Sticker [is not the promotion of critical thinking but] is to accommodate or reduce offense to those parents who hold beliefs that might be deemed inconsistent with the scientific theory of evolution” based on the pressure from many Cobb County parents to respect and tolerate student beliefs in the classroom and the fact that the existence of this pressure was widely known.¹⁶⁸ Despite citing Supreme Court precedent requiring accommodation, not merely tolerance, and warnings about not tailoring teaching to any one dogma, the court held:

In this case, the Court believes that an informed, reasonable observer would interpret the Sticker to convey a message of endorsement of religion. That is, the Sticker sends a message to those who oppose evolution for religious reasons that they are the favored members of the political community, while the Sticker sends a message to those who believe in evolution that they are political outsiders. This is particularly so in a case such as this one, involving impressionable public school students who are likely to view the message on the Sticker as a union of church and state. Given that courts should be “particularly vigilant in monitoring compliance with the Establishment Clause in elementary and secondary schools,” *Edwards*, 482 U.S. at 583-84, the Court is of the opinion that the Sticker must be declared unconstitutional. *See also Smith*, 827 F.2d at 690 (stating that courts must use “particular care” when “many of the citizens perceiving the governmental

164. *Selman v. Cobb County Sch. Dist.*, 449 F.3d 1320, 1322 (11th Cir. 2006).

165. *Id.* Order at 21, (citing *Brown v. Gwinnett County Sch. Dist.*, 112 F.3d 1464, 1467 (11th Cir. 1997); *Wallace v. Jaffree*, 472 U.S. 38, 56 (1980)).

166. *Id.* Order of the Court at ¶ 22.

167. *See Freiler Tanginahoa Parish Bd. of Educ.*, 185 F.3d 337, 347 (5th Cir. 1999) (wherein the court struck down an oral instruction urging critical thinking about evolution because the instruction, called a “disclaimer” by the court, added it was “not intended to influence or dissuade the Biblical version of Creation or any other concept.”).

168. *Selman* Order of the Court at ¶ 23.

message are children in their formative years.”) (other citations omitted).

It apparently did not dawn on the court that the message sent by removing the Sticker and establishing Darwinian Orthodoxy sends a message to those who believe that the factual scientific evidence is consistent with the concept of a Creator are the outsiders. That point is confirmed by the following:

While the School Board may have considered the request of its constituents and adopted the Sticker for sincere, secular purposes, an informed, reasonable observer would understand the School Board to be endorsing the viewpoint of Christian fundamentalists and creationists that evolution is a problematic theory lacking an adequate foundation. Of course, the *amicus* brief filed by certain biologists and Georgia scientists indicates that there are some scientists who have questions regarding certain aspects of evolutionary theory, and the informed reasonable observer would be aware of this also. On the whole, however, the Sticker would appear to advance the religious viewpoint of the Christian fundamentalists and creationists who were vocal during the textbook adoption process regarding their belief that evolution is a theory, not a fact, which students should critically consider.¹⁶⁹

The court obviously bought into the ACLU's favorite straw man in buying the allegation that to declare this rather innocuous, if somewhat imprecise, Sticker unconstitutional is necessary to protect against Biblical literalists or even religious inference. The *Selman* Court, however unsound its view of the current state of science, finds support in the subsequently decided *McCreary* and *Van Orden* decisions which raised the banner of motivation as a controlling principle rather high. It is hard not to conclude that hostility towards traditional religion is the disabling factor.

Interestingly, the court finds it significant that although evolution, at least insofar as it applies to mechanisms, is universally referred to as a theory,¹⁷⁰ “the distinction of

169. *Id.* Order of the Court at ¶ 24.

170. Parents for Truth in Education, participating as *Amici Curiae*, argue that the Sticker properly references evolution as a theory because prior case law, the dictionary, and other sources do the same. See Brief of Parents for Truth in Education 7-9. In this regard, amid note that the Supreme Court referred to evolution as a “theory” in both the *Edwards* and *Epperson* decisions and that Justice Brennan, concurring in the

evolution as a theory rather than a fact is the distinction that religiously motivated individuals have specifically asked school boards to make in the most recent anti-evolution movement,"¹⁷¹ once again allowing motivation to trump legitimate concerns.

The court then concludes that the Sticker violates the second prong of the *Lemon* test (purpose) and the parallel endorsement test (based on the view of an observer) which the court has incorporated into its *Lemon* analysis.

In short, the Sticker is unconstitutional, because of the inferred motivation of the school board in adopting it and because, by placing such a Sticker in the book, some student sitting in a public school biology classroom might realize that some parents exercising their right to free speech, while pressuring the school board, based their objections to only teaching Darwinian evolution on their religious beliefs.

In explaining its policy to critically consider evolution, the school board involved in *Selman* stated "[i]t is the intent of the Cobb County Board of Education that this policy not be interpreted to restrict the teaching of evolution, to promote or require the teaching of creation, or to discriminate against, or on behalf of, a particular set of religious beliefs, religion in general, or non-religion."¹⁷² The ACLU, speaking for the plaintiffs, stated, while equating evolution with Darwinian Orthodoxy, that "promoting critical thinking about evolution is futile and contrary to scientific consensus because most professional science associations do not endorse teaching the evidence against evolution."¹⁷³ It is the presumed encouragement of doubts about or evidence questioning Darwinian Orthodoxy that concerns the ACLU. As to the textbook itself, according to the court "[t]he parties do not dispute that the science textbook into which the Sticker was placed offers a comprehensive perspective of current science

Edwards decision, cited a dictionary that defined "evolution" as a theory." *Id.* at 7. *Amici* also argue that the *Edwards* Court implicitly acknowledged that evolution is not a fact by making the statement that "[w]e do not imply that a legislature could never require that scientific critiques of prevailing scientific theories be taught." *Id.* at 8 (citing *Edwards*, 482 U.S. at 593). Order at 41.

171. Order of the Court at 42, *Selman*.

172. Order of the Court at ¶ 3, *Selman* (Mar. 31, 2004) (quoting the school board policy).

173. Plaintiff's Response to Defendant's Motion for Summary Judgment at 20, *Selman*. Plaintiffs' statement of material facts is replete with references to Darwin, randomness, and materialism.

thinking regarding theory of origins.”¹⁷⁴ If that were so, it would discuss the current controversies and the Sticker would be superfluous.

Both the *Cobb County Board of Education* and the *Selman* courts seem to be oblivious to their confusions about what exactly evolution means. This is not surprising since a number of such definitions combine the presumed mechanism driving change with the observational fact that life has changed over time.

C. The 11th Circuit Remand of Selman

The confusion wrought by the Establishment Clause case law and the various tests used by the Supreme Court is well illustrated in the opinion of the Eleventh Circuit remanding *Selman*. It did so to allow the district court to address certain factual issues that were not clear on the record stating that “[k]nowledge of the particular facts and circumstances is essential to a determination of whether the governmental acts in question are religiously neutral.”¹⁷⁵ These inquiries follow:

(1) With the exception of the parents comments submitted during the textbook review process, what, if anything, was submitted to the school board (by parents or other members of the community) before the adoption of the sticker?”

(2) Was a petition representing any view regarding the teaching of evolution submitted to the board prior to its March 28, 2002 decision to place the sticker in the textbooks? If so, by whom and what did it say?

(3) Did [a Cobb County parent] organize and present a petition to the board with the signatures of 2,300 Cobb County residents asking the board to do any or all of the following things: (1) clearly identify presumptions and theories and distinguish them from fact; (2) ensure the presentation of all theories regarding the origin of life; and (3) place a statement prominently at the beginning of the text warning students that the material on evolution is a theory not a fact?”

174. Order of the Court at ¶ 4, *Selman*.

175. *Selman v. Cobb County Sch. Bd.*, 449 F.3d. 1320 (11th Cir. 2006).

(4) Was the sticker a board-initiated idea, as Superintendent Joseph Redden testified, or did the idea for the sticker originate with some other source? If so, who was that source?

(5) Who formulated the wording of the sticker? Did the board ask its attorney to draft the language of the sticker in response to the petition? Did the language come from the Board's attorney? Did the attorney draw that language from any petition or letter? If so, what? Did anyone propose that language for a religious purpose?"

(6) What happened at the March 13, 2002 school board meeting? Was the board specifically asked to place a disclaimer in textbooks that contain materials on evolution? If that request was made, who made it, and in what form?

(7) Do the minutes from the school board's March 27-28, 2002 meetings support the conclusion that citizens concerns prompted the board to consider the idea of putting a statement at the beginning of certain science textbooks?

(8) Did the idea of placing a sticker in the textbooks originate with those parents and citizens who opposed the presentation of evolution in science classrooms without other theories, including creationism theories, being included in the curriculum?

(9) In finding an unconstitutional endorsement, the order issued January 13, 2005 refers to "the sequence of events that led to the Sticker's adoption." Selman, 390 F. Supp. 2d at 1308. What does the sequence of events include and in what order did they occur?¹⁷⁶

This set of questions clearly indicates that the motivation of those advocating the Sticker and the purpose of the board in approving it are paramount. The merits of any criticism do not seem to be germane. The court apparently is saying if the board decided on the disclaimer before any serious pressure from those religiously motivated it could pass constitutional muster but then again perhaps not since it might run afoul of the endorsement test. On the other hand, question (8) reflects the confusion of the Court as to the definition of evolution. The implication is that evolution means Darwinian Orthodoxy.

176. *Id.* at 1212.

The Court seems to be claiming that any criticism of the Modern Synthesis would cause an objective observer to conclude that the Sticker was placed in the book to advance religion. That observer would be charged with knowledge of how it got there, that is, did those with a religious motivation play a significant role. The accuracy of any criticisms of Darwinian Orthodoxy is irrelevant if the criticisms are motivated by religious belief nor is offense to the religiously inclined to be considered.

D. The Kitzmiller Decision

Kitzmiller, demonstrates the disabling of religious free speech and the court's preference for ideology over science. To fully understand *Kitzmiller* the following should be kept in mind:

(1) There is no consistent definition of evolution. In so far as the court defines evolution, it does so from a Darwinian perspective, that is, it implicitly includes in the definition the mechanisms advanced by orthodox Darwinists. In fact, in its "Conclusion" the court states. "To be sure, Darwin's theory of evolution is imperfect. However, the fact that a scientific theory cannot yet render an explanation on every point should not be used as a pretext to thrust an untestable alternative hypothesis grounded in religion into the science classroom or to misrepresent well-established scientific propositions."¹⁷⁷

(2) Intelligent design is equated with creationism hence considered a religious doctrine rather than merely an inference with religious content.

(3) The context of the questions about Darwin's theory is the crucial issue not its explanatory power.

In explaining his position, Judge Jones' central argument is put thusly:

An Objective Observer Would Know that ID and Teaching About "Gaps" and "Problems" in Evolutionary Theory are Creationist, Religious Strategies that Evolved from Earlier Forms of Creationism.

177. *Kitzmiller v. Dover Area Sch. Dist.*, 400 F. Supp. 2d 707, 765 (M.D. Pa. 2005).

The history of the intelligent design movement (hereinafter “IDM”) and the development of the strategy to weaken education of evolution by focusing students on alleged gaps in the theory of evolution is the historical and cultural background against which the Dover School Board acted in adopting the challenged ID policy. As a reasonable observer, whether adult or child would be aware of the social context in which this ID policy arose.¹⁷⁸

The court discussed the objective observer from the standpoint of a public school student and from the standpoint of a citizen of the school district. The analysis based on an adult citizen observer was mandated, according to the court since “the Dover Board made and subsequently defended its decision to implement the curriculum change publicly, thus casting the entire community as the “listening audience” for its religious message.”¹⁷⁹ The court went on to state that it is compelled to consider the listening audience by the decision in *Allegheny*¹⁸⁰ which quoted *Ball*¹⁸¹ to the effect that “when evaluating the effect of government conduct under the Establishment Clause, we must ascertain whether ‘the challenged governmental action is sufficiently likely to be perceived by adherents of the controlling denominations as an endorsement, and by the nonadherents as a disapproval, of their individual religious choice.’”¹⁸² This, of course, must include the choice not to be a believer.

The court described the process of determining who an objective Dover high school ninth grade student would be as follows:

In ascertaining whether an objective Dover High school ninth grade student would view the disclaimer as an official endorsement of religion, it is important to note that a reasonable, objective student is not a specific, actual student, or even an amalgam of actual students, but is instead a hypothetical student, one to whom the reviewing court imputes detailed historical and background knowledge, but also one who interprets the challenged conduct in light of that knowledge with the level of intellectual sophistication that a

178. *Id.* at 715.

179. *Id.* at 724 (citing *Santa Fe*, 530 U.S. at 308).

180. *Allegheny*, 492 U.S. at 593.

181. *Sch. Dist. of the City of Grand Rapids v. Ball*, 473 U.S. 373, 390 (1985).

182. *Id.*

child of the relevant age would bring to bear. *See, e.g., Child Evangelism*, 386 F.3d at 531 (“[A] reasonable observer, ‘aware of the history and context of the community and forum’ would know that [the school district] has a policy of assisting a broad range of community groups, that [the district] plays no role in composing the flyers that are sent home and does not pay for them, and that [the district’s] teachers do not discuss the flyers in class.” This detailed and sophisticated knowledge was imputed to elementary-school students.) (internal citations omitted); *Good News*, 533 U.S. at 119, 121 S. Ct. 2093 (Admonished not to proscribe religious activity “on the basis of what the youngest members of the audience might perceive.”).

Plaintiffs accurately submit that reviewing courts often make no distinction between an adult observer and a student observer when deciding whether a public school’s conduct conveys an unconstitutional message of religious endorsement. However, when such a distinction is drawn, as is appropriate to do under the circumstances of this case, courts have recognized that because students are more impressionable than adults, they may be systematically less effective than adults at recognizing when religious conduct is unofficial and therefore permissible. *See, e.g., Selman*, 390 F. Supp. 2d at 1311 (textbook sticker stating that evolution was a theory was particularly likely to convey message of endorsement given the Sticker’s intended audience, impressionable school students.¹⁸³

The court went on to discuss the religious implications of intelligent design theory. Assuming the accuracy of that discussion, the Court then focused on “The Wedge Document” developed by the Discovery Institutes Center for the Renewal of Science and Culture. As quoted by the Court, The Wedge Document is a strategy to “defeat scientific materialism and its destructive moral, cultural, and political legacies” and “to replace materialistic explanations with the theistic understanding that nature and human beings are created by God.” The Court concluded that intelligent design was a form of creationism even though it did not base its arguments “on the Book of Genesis, a young earth and a catastrophic Noaich flood” Conceding for the sake of argument that intelligent

183. *Kitzmiller v. Dover Area Sch. Dist.*, 400 F. Supp. 2d 707, at 723–24 (M.D. Pa. 2005).

design is, in fact, a form of creationism, what is it that cannot be taught? After conceding that the application of the Establishment Clause “is not a tool for excluding or ignoring material evidence,”¹⁸⁴ the Court returns to an effects and purpose test stating:

The Supreme Court also looks for legislative purpose in “the historical context of the [enactment], and the specific sequence of events leading to [its] passage” (internal citations omitted); see also *Santa Fe*, 530 U.S. at 308 (“Regardless of the listener’s support for, or objection to, the message, and “objective” Santa Fe High School student will unquestionably perceive the inevitable pregame prayer as stamped with her school’s seal of approval.”)¹⁸⁵

Applying Supreme Court precedent, the Court concludes:

After a careful review of the record and for the reasons that follow, we find that an objective student would view the disclaimer as a strong, official endorsement of religion. Application of the objective student standard pursuant to the endorsement test reveals that an objective Dover High School ninth grade student will unquestionably perceive the text of the disclaimer, “enlightened by its context and contemporary legislative history,” as conferring a religious concept on “her school’s seal of approval.”¹⁸⁶

Similarly, in the school board meetings open to the public and to members of the press, board members addressed the inclusion of the disclaimer in expressly religious terms. In addition, the board sent out a newsletter to explain changes in the biology curriculum.¹⁸⁷ The motivations of at least some sponsors of the disclaimer became evidence of purpose—to endorse religion.

The court points out that the disclaimer is immediately after “students are told that ‘Darwin’s Theory’ is just a theory and it continues to be tested as new evidence is discovered, they are told that gaps exist within evolutionary theory without any indication that other scientific theories might suffer the same supposed weakness.”¹⁸⁸

184. *Id.* at 724.

185. *Id.* (citing *Santa Fe*, 530 U.S. at 308).

186. *Id.* (citing *Selman*, 390 F. Supp. 2d at 1300).

187. *Id.* at 750, 752.

188. *Id.* at 740, 741.

The court, in a showing of faith, is convinced that what scientists cannot explain today they will explain tomorrow¹⁸⁹ and anyway “common descent and natural selection is overwhelmingly accepted by the scientific community”¹⁹⁰

What the *Kitzmiller* court is saying is that it is unconstitutional to make a factual statement if it is made in a prohibited context.

The court persistently confuses the concept of evolution with the contemporary understanding that Darwinian Theory includes assumptions about the mechanisms and processes that lead to the appearance of new body plans (novelty) in the fossil record. It is not the inaccuracy of the disclaimer that is at issue. Rather the court finds it unconstitutional because (1) Darwin’s theory is specifically questioned, (2) only Darwin’s theory “merits” a reference that it is being taught because of a state educational mandate (3) and, most significantly, the next paragraph of the disclaimer references intelligent design as an alternative to “Darwin’s view” and to “Of Pandas and People”, a creationist work according to the court.¹⁹¹ This sets up a “contrived dualism” recognized as a “creationist tactic,” in *McLean*:¹⁹²

The two model approach of creationists is simply a contrived dualism which has no scientific factual basis or legitimate educational purpose. It assumes only two explanations for the origins of life and existence of man, plants and animals: it was either the work of a creator or it was not. Application of these two models, according to creationists, and the defendants, dictates that all scientific evidence which fails to support the theory of evolution is necessarily scientific evidence in support of creationism and is, therefore, creation science ‘evidence. (emphasis added)¹⁹³

If one takes Dawkins, Dennett, Provine and certain others seriously, the dualism is an inference arising from Darwinian Orthodoxy of purposelessness and chance in a godless universe without design. The Court is, in effect, making a choice by equating Darwinian Orthodoxy with the theory of evolution.

189. *Id.* at 738.

190. *Id.* at 743.

191. *Id.* at 716.

192. *Id.* at 725.

193. *McLean*, 529 F. Supp at 1266.

The last paragraph encourages students to keep “an open mind” and “leaves the discussion of the Origins of Life to individual students and their families.”¹⁹⁴

At this point Judge Jones’ opinion illustrates the current confusion wrought by the courts. If Judge Jones objects to a student inferring from the evidence and speculations of many scientists that there is a God or Creator or intelligent designer, then he has condoned view point discrimination and exhibited hostility rather than neutrality towards religion. It is important to note again that a belief in evolution does not necessarily mean that one must believe in the assumptions, inference and extrapolations of Darwinian Orthodoxy. Disagreement with Darwinists is not necessarily religious, and as demonstrated elsewhere is widespread. It is not alternatives to evolution that is the real issue in *Kitzmiller*, rather it is alternatives to Darwinian inferences. Unfortunately, the Dover school board posited intelligent design as an alternative inference; although the court claimed it was offered as an alternative to evolution virtually identical to Biblical Creationism taken literally, which is the favorite straw man of the Darwinian establishment. The Court also analogized the last paragraph to the disclaimer in *Freiler v. Tangipahoa Parish Board of Education*,¹⁹⁵ and found it objectionable because schoolchildren might maintain beliefs taught by their parents. This presumably would stifle critical thinking in order to protect religious views.¹⁹⁶ The Court, again citing *Freiler* was concerned that students would not “approach new concepts with an open mind and willingness to alter and shift viewpoints”¹⁹⁷ Perhaps Steele¹⁹⁸, Gould¹⁹⁹ and McClintock²⁰⁰

194. *Kitzmiller*, 400 F. Supp. at 743.

195. *Freiler v. Tangipahoa Parish Bd. of Educ.*, 185 F.3d 337, 344–47 (5th Cir. 1999).

196. *Kitzmiller*, 400 F. Supp. at 749.

197. *Id.* at 725.

198. See EDWARD I. STEELE, ROBYN A. LINDLEY, & ROBERT V. BLANDON, LAMARCK’S SIGNATURE: HOW RETROGENES ARE CHANGING DARWIN’S NATURAL SELECTION PARADIGM XIX (1998). (Edward J. Steele is Associate Professor of Biological Sciences at the University of Wollongong, Australia. Robyn A. Lindley is Director of the Technology Innovation Research Centre at the University of Wollongong, Australia. Robert V. Blanden is in the division of Immunization and Cell Biology at the John Curtin School of Medical Research in Canberra, Australia.).

199. See, e.g., John Tooby & Leda Cosmides, Letter to the Editor of THE NEW YORK REVIEW OF BOOKS on Stephen Jay Gould’s *Darwinian Fundamentalism* (June 12, 1997) and *Evolution: The Pleasures of Pluralism* (June 26, 1997) CENTER FOR EVOLUTIONARY PSYCHOLOGY, USCB, July 7, 1997, available at

among others, might wish that the Darwinian establishment, so well exemplified by Richard Dawkins and William Dennett, exhibited such a willingness to shift viewpoints.

In summarizing the effect of the disclaimer and the actions surrounding it, the Court found an endorsement of religion:

Accordingly, we find that the classroom presentation of the disclaimer, including school administrators making a special appearance in the science classrooms to deliver the statement, the complete prohibition on discussion or questioning ID, and the “opt out” feature students may leave when disclaimer is read all convey a strong message of religious endorsement.²⁰¹

Kitzmiller clearly implies that because science is the study of natural or material causes, anything that posits non-material causation is religion. Since the Supreme Court has so expanded the reach of the Establishment Clause, it is not surprising that Judge Jones would find endorsement. On the other hand, it is hard not to conclude that religious free speech is disabled even as to a generalized inference that there could be other than material or natural explanations for certain phenomena. However, it is also important to note that the school board, a state agency, attempted “to inject religious concepts into the science curriculum”²⁰² and the court was critical of the policy of the board not allowing discussion or questioning of intelligent design. Presumably if a student raised the issue, there would be no objection by Judge Jones absent the endorsement of a religious view by state authorities. The district court opinion in *Selman*, however does not imply such broad mindedness.

Contrary to the court’s discussion, advocates of Darwinian Orthodoxy do indeed take a position on religion. Darwinism does lead to an inference of atheism. Critics of Darwinian

http://www.cogweb.ucla.edu/Debate/CEP_Gould.html; John Alcock, *Misbehavior*, available at <http://www.bostonreview.net/BR25.2/alcock.html>.

200. Howard Green, In Memoriam: Barbara McClintock, June 12, 1999, http://nobleprize.org/noble_prizes/medicine/articles/green/index.html. (Barbara McClintock of the Cornell Faculty won the Noble Prize in Physiology or Medicine in 1983. “During the fifties and sixties, when she was doing her most original work, she was ignored to such an extent that she did not even want to publish. From time to time, her morale was low, even though she was utterly confident of her most important discovery: the mobility of genetic elements [transposons]”).

201. *Kitzmiller*, 400 F. Supp. 2d at 728.

202. *Id.* at 725.

Orthodoxy are not confined to those with religious motivations; they are critical based upon evidence that raises questions about the central tenets of the Modern Synthesis. A witness, favorably quoted by Judge Jones, claimed that the disclaimer created a “false duality . . . it ‘tells students’ . . . quite explicitly, choose God and the side of intelligent design or choose atheism on the side of science.”²⁰³ Does this imply that Darwinism is scientific truth, not to be questioned? This is a false absolute not consistent with scientific thought. It appears that both the advocates of the disclaimer and Judge Jones waded into the science of evolutionary theory without much sophistication, demonstrating the immiscibility of science, law and ideology.

The court asserts that the board, through its newsletter, suggests, “that scientists engage in trickery and double speak about the theory of evolution by stating: ‘The word evolution has several meaning, and those supporting Darwin’s theory of evolution use that confusion in definitions to their advantage.’”²⁰⁴ Evolution is, indeed, defined in several ways²⁰⁵ and some do include Darwinian mechanism in that definition which does lead to confusion. Why the court thought that the board was charging scientists with trickery is not apparent from the quoted language. Perhaps the Court has decided that the only theory of evolution is that formulated by orthodox Darwinists. The board goes on to claim that “the theory of intelligent design (ID) is a scientific theory that differs from Darwin’s view, and is endorsed by growing number of credible scientists.”²⁰⁶ If science is a study of natural or material causes, intelligent design is not a scientific theory; rather it is an inference from evidence made by many, including some prominent scientists. For example, one of the central tenets of Darwinian theory is an inference. Evidence for microevolution is extrapolated to provide support for macroevolution.²⁰⁷

The board then proceeded to claim in its newsletter that “in simple terms, on a molecular level, scientists have discovered a purposeful arrangement of parts, which cannot be explained by Darwin’s theory. In fact, since the 1950s, advances in molecular biology and chemistry have shown us that living

203. *Id.*

204. *Id.* at 730.

205. See *supra* notes 105-113 and accompanying text.

206. *Kitzmiller*, 400 F. Supp. 2d at 730.

207. See *supra* notes 68-69.

cells, the fundamentals units of life processes, cannot be explained by chance.”²⁰⁸ In fact, Darwinian Theory attempts to explain the molecular structure of DNA and proteins as can other non-Darwinian theories.²⁰⁹ It is true, however, that the appearance of living cells is as yet unexplained, but prominent scientists are working on the problem. It is also true as the board’s newsletter claimed that Darwin’s theory has atheistic implications. It all depends on the inferences made from the factual evidence.

The court then cites *Selman* to support its implicit view that any criticism of Darwinian Orthodoxy is religion. The *Selman* court in finding a rather innocuous disclaimer unconstitutional stated that “[w]hether evolution [is] referenced as a theory or a fact is . . . a loaded issue with religious undertones,” reflecting “a lengthy debate between advocates of evolution and proponents of religious theories of origin.” It is “one of the latest strategies to dilute evolution instruction employed by anti-evolutionist with religious motivations.”²¹⁰ A reasonable observer is presumed to know the social meaning of the theory-not-fact- deliberate word choice and would “perceive the School Board to be aligning itself with proponents of religious theories of origin,” thus “communicat[ing] to those who endorse evolution that they are political outsiders, while . . . communicat[ing] to the Christian fundamentalists and creationists who pushed for a disclaimer that they are political insiders.”²¹¹

Since it is true that evolutionary theory is based on both fact and inference, it is a fair statement for the school board to say that Darwin’s theory of evolution is not entirely based on fact. The court ignores this by stating that “science has been a discipline in which testability . . . has been the measure of a scientific idea’s worth.” This self-imposed convention of science, which limits inquiring to testable, natural explanations about the natural world, is referred to by philosophers as “methodological materialism” and sometimes known as the scientific method. “Methodological naturalism is a ‘ground rule’

208. *Kitzmiller*, 400 F. Supp. 2d at 730; See also, HAROLD, *supra* note 21, at 239, 256.

209. See, e.g., PAGE & HOLMES, *supra* note 111, at 106 discussing genetic drift and the loss of adaptive mutations; KIMURA, *supra* note 104; STEELE ET AL, *supra* note 198.

210. *Selman*, 390 F. Supp. 2d at 1304, 1307-08 (citing *Edwards*, 482 U.S. at 624).

211. *Id.* at 1308.

of science today which requires scientist to seek explanations in the world around us based upon what we can observe, test, replicate, and verify.”²¹² This is quite so as the court may have recognized when it quoted the National Academy of Sciences to the effect that “[s]cience is a particular way of knowing about the world. In science, explanations are restricted to those that can be *inferred* from the confirmable data – the results obtained through observations and experiments that can be substantiated by other scientists.” (emphasis added).²¹³ It is worth repeating that the court does concede, based on expert testimony, that scientists can not necessarily explain how biological systems evolved but noted that this “does not mean that they cannot, and will not, be able to explain them tomorrow.”²¹⁴

It is inescapable that the court’s real objection is not about the truth or falsity of the board’s statements, but like *Selman*, it is the presumed motivations of disclaimer supporters; the fact that Darwin’s theory is singled out by certain religious individuals for attack and the alleged affect on observers. In this respect, religious free speech is disabled. The Supreme Court has stated that scientific criticisms of Darwin’s theory are not barred. However, the case law focuses not on factual disputes but on motivations of those raising issues and the fact that some attack Darwinian Orthodoxy on biblical grounds allowing those who have an ideological commitment to set-up a straw man – the biblical literalists. At the same time, by equating intelligent design with creationism and criticisms of Darwinian Orthodoxy with intelligent design, the courts cause school boards to shy away from even scientifically well supported criticisms. The “listening audience” becomes the judge of the limits on free speech. The reasonable observer according to Judge Jones, citing Justice O’Connor’s concurring opinion in *Pinette* is a hypothetical reasonable observer who is a “personification of a community ideal of reasonable behavior, determined by the [collective] social judgment.”²¹⁵

But the *Kitzmiller* court preoccupied by the intelligent design – Darwin dichotomy returns to the majority is right analysis. Plaintiffs’ expert in biology, Dr. Miller, a widely-

212. *Kitzmiller*, 400 F. Supp. 2d at 735.

213. *Id.*

214. *Id.*

215. *Id.* at 780.

recognized biology professor at Brown University who has written university-level and high school biology textbooks used prominently throughout the nation, provided un rebutted testimony that evolution, including common descent and natural selection, is “overwhelmingly accepted” by the scientific community. As the court in *Selman* explained, “evolution is more than a *theory* of origin in the context of science. To the contrary, evolution is the dominant scientific theory of origin accepted by the majority of scientists.”²¹⁶ This is true, but not all scientists accept the Darwinian explanations and since when is the majority always right?

In concluding its opinion in *Kitzmiller*, the court found no valid secular purpose applying *Edwards* and the first prong of the *Lemon* test. The reference to intelligent design in the language of the disclaimer and the sequence of events leading to its adoption constituted an endorsement of religion. The effect of the board’s actions was to advance religion, citing the second (effects) prong of the *Lemon* test and commenting on its relationship to the endorsement test. For Judge Jones, relying on a statement issued by the National Academy of Sciences, “[e]xplanations that cannot be based upon empirical evidence are not part of science.”²¹⁷ Empirical is defined as “relating to or based on direct experiences or observations alone.”²¹⁸ If this is really science, Darwinian macroevolutionary theory might have to be confined to the realm of faith.²¹⁹

IV. CHALLENGES TO DARWINIAN ORTHODOXY

The following provides a brief and incomplete summary of challenges to Darwinian Orthodoxy.

One of the more significant challenges to a central pillar of Darwinian Orthodoxy is contentions that genetic drift rather than natural selection is the primary engine of organism change.²²⁰ Once a mutation has arisen in a population it can become fixed or lost. “Which outcome a new allele faces it not always [a question] of how much better or worse it is compared to other alleles already present in the population. Instead it

216. *Selman*, 390 F. Supp. 2d at 1309 (emphasis added in original).

217. *Kitzmiller*, 400 F. Supp. 2d at 736.

218. FUNK AND WAGNALLS, STANDARD DICTIONARY (2d. ed. 1980).

219. See *supra* Part II.B.

220. KIMURA, *supra* note 104.

may simply be down to chance.”²²¹ This means that alleles may be “randomly sampled and this . . . can change gene frequency. This is called genetic drift.”²²² In analyzing natural selection versus genetic drift as the primary engine of evolution, the authors of “Molecular Evolution”²²³ contrary to Gould, assert that natural selection works best when a population is large, otherwise chance processes predominate.²²⁴

In certain studies the very opposite of genetic drift or natural selection acting randomly has been demonstrated. In an experiment with bacteria, the frequency of a certain mutation was increased by a modification in the substrate on which they were grown allowing such mutated bacteria to live on substrate ordinarily indigestible to the unmutated bacteria.²²⁵ This result seems to contradict one of the supporting tenets of Darwinian thinking known as “Weismann’s Barrier”²²⁶ which forbids the flow of the genetic material or information from somatic cells to germ cells. August Weismann “disproved” Jean-Baptiste de Monet Lamarck’s theory of the inheritance of fundamental adaptations by the nonsensical act of mutilating rats by cutting off their tails and then breeding them.²²⁷ The offspring had tails supposedly disproving inheritance of acquired characteristics. Lamarck’s theory is about the inheritance of functional adaptations and the possibility of induced functional mutations not mutilations. Further support, for induced adaptations comes from experiments on the immune system cited below.

To put one issue directly, the Modern Synthesis theorizes that genetic variability (by mutation or by recombination of

221. PAGE & HOLMES, *supra* note 111, at 106.

222. *Id.*

223. *Id.*

224. *Id.* at 105-106.

225. Study of John Cairns of Harvard University in EDWARD S. STEEL, ROBYN A. LINDLEY, AND ROBERT V. BLANDEN, LAMARCK’S SIGNATURE: HOW RETROGENES ARE CHANGING DARWIN’S NATURAL SELECTION PARADIGM 193-94 (Perseus Books 1998).

226. OXFORD DICTIONARY OF BIOLOGY (3d ed. 1996) describes Weismann’s Barrier as follows:

the theory of the *continuity of the germ plasm* . . . [which] proposes that the contents of reproductive cells (sperms, ova) are passed on unchanged from one generation to the next, unaffected by any changes undergone by the rest of the body. It thus rules out any possibility of the inheritance of acquired characteristics, and has become fundamental to neo-Darwinian theory.

227. See GOULD, *supra* note 94, at 201-03.

differing alleles) exists before natural selection acts to favor the more adaptive expression. The Lamarckian view is that genetic variability is generated at the same time as natural selection operates. This thesis is developed with reference to the immune system in *Lamarck's Signature: How Retrogenes Are Changing Darwin's Natural Selection Paradigm*.²²⁸ In short, the authors contend that advances in DNA sequencing and other aspects of molecular biology reveal that certain acquired structures of the immune system may be transferred from parent to offspring defying commonly held evolutionary beliefs.

Predictably the Darwinian fundamentalists are aghast. Professor Jan Klein in panning an earlier book on the same general topic stated, "[u]nless he [Steele] is willing to admit that genes, cells, organs, organisms – or God – all know what they are doing (and thus make his view truly Lamarckian,) he is in the same boat as the Darwinists – only his boat is leaking."²²⁹ Contrary to Professor Klein, the inheritance of functional adaptations does not necessarily involve "purpose" or "design", although such may be inferred. The problem that apparently troubled Professor Klein lies with exactly how did DNA sequences, or potential to code arise prior to, sometimes hundreds of millions of years prior to their selection (their phenotypic expression)? An interesting sidelight to this is evidence for the plasticity of certain genes. In a recent interview Edward O. Wilson pointed out that the leaves of the arrow leaf plant vary phenotypically depending upon the environment.²³⁰

This brings us to *Astrobiology, the Origin of Life and the Death of Darwinism*²³¹ which is very much a follow up to Sir Fred Hoyle's *Evolution from Space*.²³²

Dr. Joseph points out that there are many common genes found in many disparate life forms; forms that diverged

228. See STEELE ET. AL., *supra* note 198, at 58.

229. *Id.* at 167. Richard Dawkins expressed fear at this notion, saying "[i]t is one of the few contingencies for which I might offer to eat my hat." (quoting RICHARD DAWKINS, *THE EXTENDED PHENOTYPE* 164-65 (1982)).

230. Richard Conniff, *The Discover Interview: Edward O. Wilson*, DISCOVER, June 2006 at 61.

231. RHAWN JOSEPH, *ASTROBIOLOGY, THE ORIGIN OF LIFE AND THE DEATH OF DARWINISM* (University Press California 2d ed. 2001).

232. SIR FRED HOYLE AND CHANDRA WICKRAMASINGHE, *EVOLUTION FROM SPACE: A THEORY OF COSMIC CREATIONISM* (Simon and Shuster 1981).

between 1.3 and 3.0 billion years ago.²³³ Without getting too technical the age of the earth (estimated at 4.0 billion years) would not be enough time for these complex DNA sequences to have arisen. This leads to the non-Darwinism conclusion that specific DNA sequences existed hundreds of million of years before their phenotypic expression. Dr. Joseph argues that “these common genes were either inherited and preprogrammed to emerge in response to changing environmental conditions (being passed down from common ancestors as silent genes), and/or they were acquired through gene and plasmid exchange.”²³⁴

A most interesting discussion by Simon Easteal²³⁵ touches on both delayed phenotypic expression and gradualism. He points out that the fossil record does not support gradualism for the evolution of placental mammals. That record indicates a radiation with most of the mammalian orders arising at the same time, that is, some 65 million years ago. On the other hand, “[m]olecular evidence supports a branching pattern [separate divergences] that started much earlier.”²³⁶ Easteal speculates that the placental mammals diverged phylogenically before diversifying morphologically, “implying a decoupling of the evolutionary processes associated with speciation and adaptation” which is a non-Darwinian thought underlined by the statement that “there are no useful models that allow the role of morphological evolution to be predirected . . . due to lack of understanding of the genetic basis of morphological evolution.”²³⁷

One of the arguments against the purposeless gradualism of orthodox evolutionary theory is irreducible complexity. This is popularly stated as what good is 5% of an eye? How does

233. JOSEPH, *supra* note 231, at 9.

234. *Id.*; GOULD, *supra* note 94, at 1143. Gould explains related facts thusly:

But the first fruits of evo-devo have reversed this scenario by documenting a full complement of *Hox* genes in the most homonomously segmented invertebrate bilaterian phyla, thus suggesting the opposite process of loss and divergence for the differentiation.

235. Simon Easteal, *Molecular Evidence for the Early Divergence of Placental Mammals*, BIOESSAYS 21, 1052-58 (1999).

236. *Id.* at 1053.

237. *Id.* Note that this fits Kimura's demonstration of the predominance at the molecular level of neutral change leaving genotypic mutations largely silent or invisible at the phenotypic level, which introduces questions about adaptationist forces as the only or even prime cause behind genotype variations. See KIMURA, *supra* note 104, at 55.

Darwinian natural selection explain that a functioning eye needs an eye socket, nerves and a connection to a brain? An attempt to explain this was made by biologists Dan-Erik Nilsson and Susanne Pelger.²³⁸ Whether they were successful in a matter of hot dispute partially resulting from some mischaracterization of what they did by supporters.²³⁹ What they did to “prove” an eye could form gradually thorough random, purposeless evolutionary processes involved a series of assumptions and speculations that hardly comport with randomness.²⁴⁰

As a retort to the arguments based on the irreducible complexity of certain systems, such as the cell itself,²⁴¹ the vertebrate eye and the immune system advanced most cogently by Michael Behe,²⁴² Darwinists theorize exaptation.²⁴³ Exaptation is defined as an adaptation where the biological function currently performed by the structure was not the function performed when the adaptation evolved under presumed earlier pressures of natural selection.²⁴⁴ Exaptation is a necessary corollary to natural selection since “natural selection in the organismal mode can only construct local

238. Dan-Erik Nilsson and Susanne Pelger, *A Pessimistic Estimate of the Time Required for an Eye to Evolve*, in PROCEEDINGS OF THE ROYAL SOCIETY, 256 (1994).

239. David Berlinski, *A Scientific Scandal*, 115 COMMENTARY 29 (April 2003). The author discusses that article. Mr. Berlinski points out that contrary to certain Darwinian thinkers, the authors did not develop a “computer simulation of the eye’s evolution and didn’t claim they did. Since the eye is often cited by intelligent-design theorists (of which Berlinski is not) as an example of irreducible complexity, Berlinski’s critique of Nilsson’s and Pelger’s work, if valid, removes an oft-cited “proof” of Darwinian evolution. See David Berlinski, *Has Darwin Met His Match?*, 114 COMMENTARY 31, 34 (Dec. 2002) (wherein he critiques intelligent design theory and quotes Darwin as writing, “[if] it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive slight modifications, my theory would absolutely break down.”).

240. Berlinski, *A Scientific Scandal*, *supra* note 239, at 32.

241. Bruce Alberts, *The Cell as a Collections of Protein Machines: Preparing the Next Generation of Molecular Biologists*, CELL at 291 Feb. 1998 (“The entire cell can be viewed as a factory that contains an elaborate network of interlocking assembly lines, each of which is composed of large protein machines. . . . Why do we call the large protein assemblies that underlie cell function *machines*? Precisely because, like the machines invented by humans to deal efficiency with the macroscopic world, these protein assemblies contain highly coordinated moving parts.” I do not suggest that Mr. Alberts is other than a Darwinist.).

242. See MICHAEL BEHE, *DARWIN’S BLACK BOX* (Free Press 1996).

243. Stephen J. Gould & Elizabeth Vrba, *Exaptation-A Missing Term in the Science of Form*, in PALEOBIOLOGY 8 (1982) at 4-15. (“[C]omplex physical traits might evolve from simpler structures.”).

244. GOULD, *supra* note 94, at 86.

adaptations in the here and now.”²⁴⁵ The imputation of immediate selective advantage to a change is necessary else an inference might arise that the correlation of systems or even organisms has a direction rather than the accepted Darwinian explanation that selected for adaptive features are later co-opted for different functions.²⁴⁶ Exaptation is an inferred explanation with some observational support in the literature. Gould, with his usual creativity adds a bit of a twist likening some structures to architectural spandrels. By this he means the appearance in organisms of a non-adaptive structure or feature as a side consequence of an adaptive change or mutation which is then available for later co-option to utility as an exaptation.²⁴⁷ In molecular terms this is called genetic hitchhiking which is postulated to occur “when a neutral mutation receives a ride with a mutation that selection is driving to fixation.”²⁴⁸

While pointing out the radically more complex structure of eukaryote cells as opposed to prokaryote cells, Franklin Harold was constrained to state:

I do not mean to imply that eukaryotic cells are the product of intelligent, purposeful design, the *supposition* is that the adaptive evolution of cytoskeleton and intracellular membranes made possible the proliferation of larger cells displaying varied and elaborate morphology. All the same, it is instructive to examine eukaryotic cells from the viewpoint of design (“reverse engineering”), as diverse ensembles of parts that answer to particular constraints and serve functional purposes. The function with which we are here concerned is the construction of complex forms on a scale far above the molecular, from micrometers to millimeters (and beyond: the neurons that control the giraffe’s neck must be several meters in length). In the generation of large-scale order, internal membranes and the cytoskeleton play the star roles. (emphasis added)

However,

It leaps out at us, whether we are watching the living cell or pore over its ultrastructure, how cells manage the choreography of their components is still nearly as baffling as

245. *Id.* at 1271.

246. *Id.*

247. *Id.* at 1272.

248. PAGE & HOLMES, *supra* note 111, at 268.

it seemed to [researchers] two decades ago. Our ignorance in this matter constitutes a huge lacuna in our understanding of living things; it is fair to say that in the absence of satisfying ideas about pattern generation cells (and therefore life itself) remain fundamentally unintelligible.²⁴⁹

Harold points out that:

[m]any biologists have come to agree that shifts in gene frequency... cannot account for the origin of hair or compound eyes, let alone the emergence of mammals from reptiles. No one argues that genes are irrelevant, but rather that such major transformations require novel genes and also drastic reorganization of the pathways of development.²⁵⁰

Sooner or later quantum mechanics would give rise to a theory and it is set forth cogently in *Quantum Evolution* by Professor Johnjo McFadden.²⁵¹ Finding the definition of life given by the "The Exobiology Programme of the American Space Agency" at NASA that "[l]ife is a self-sustained chemical system capable of undergoing Darwinian evolution"²⁵² insufficient since "[i]t is hard enough to detect Darwinian evolution on Earth", Professor McFadden suggests a descriptive definition that life is recognizable in its ability to "perform autonomous or *directed actions*."²⁵³ In critiquing the determinism of classical science (including orthodox Darwinists), he points out that scientists "cannot account how living creatures are able to direct their actions according to their own internal agenda."²⁵⁴

While avoiding a discussion of irreducible complexity of the eye, McFadden addresses the complexity of biochemical pathways that "do not appear reducible" giving the example the

249. HAROLD, *supra* note 21, at 121, 142.

250. *Id.* at 196.

251. JOHNJOE MCFADDEN, QUANTUM EVOLUTION: HOW PHYSIC'S WEIRDEST THEORY EXPLAINS LIFE'S BIGGEST MYSTERY at 76 (2002). McFadden also points out that "[t]he phenomenon of multidrug resistance in TB is a major problem for its control throughout the world, but I believe it also poses a problem for neo-Darwinian evolution. The acquisition of multidrug resistance for strain W must have involved a series of seven mutations: sensitive strain → resistance to one drug → resistance to two drugs → → → → strain W, resistant to all seven. Darwinian natural selection could have guided the evolution of the strain W through this series of mutations, *but only if each step along the path provided a selective advantage to the tubercle.*" (emphasis in original).

252. *Id.* at 13.

253. *Id.*

254. *Id.* at 15.

transformation of AMP (adenosine monophosphate) to ATP (the energy carrying molecule) which “involves thirteen independent steps involving twelve different enzymes”.²⁵⁵

McFadden claims that classical science cannot explain life’s emergence or evolution. “A chemistry of small numbers, a quantum chemistry, is needed to account for life’s emergence” and life’s changes.²⁵⁶ In short, McFadden argues that the environment is the observer destroying quantum coherence and, “at least the evidence for quantum superposition.”²⁵⁷ Decoherence occurs whenever, for example, a DNA proton couples with a complex environment.²⁵⁸ This leads to a quantum explanation for why there are adaptive mutations. The environment “chooses” which state existing as a superposition it interacts with (the measurement) allowing a classical observation. To this Professor Brian Greene agrees. He explains the transformation of quantum ambiguity to measurable reality, by stating that it is the environment that coaxes changes in quantum indeterminacy.²⁵⁹ There is, in short, according to Professor Greene, no such thing as an independent system which seems a direct challenge to Darwinian randomness. As McFadden, citing Professor Cairns, states, biologists are “very reluctant to accept any revision of [Darwinian] dogma,”²⁶⁰ hence, Cairns’ conclusions regarding bacterial mutations are resisted.

In an attempt to explain the lack of evidence for gradualism, the problem of irreducible complexity and the seeming prevalence of adaptive mutations, McFadden suggest the following:

To see [the effects of quantum measurement] more clearly we need that nudge, or directed action, to be *fixed* in some way. Actions get fixed inside living cells if they cause changes to the cell’s heritable material. This is the basis of quantum evolution.

. . . .

255. *Id.* at 76.

256. *Id.* at 221.

257. *Id.* at 224.

258. *Id.* at 261.

259. GREENE, *supra* note 69, at 210-13.

260. MCFADDEN, *supra* note 251, at 259-263.

The key to the cell's ability to perform quantum measurements is the chain of entanglement from fundamental particles to the environment of the living cell. A mutation may be thought of as involving the placement of a proton. A proton is a quantum mechanical entity that cannot have a defined position in space until a quantum measurement *puts it there*.

If there are two possible positions for our target proton on the DNA molecule, it must exist as a quantum superposition . . . a quantum measurement needs to be made; and that measurement can be performed only under appropriate environmental conditions. Conditional quantum measurement thereby sits astride the engine of evolution: mutation environmental enhancement of mutation rates is precisely the phenomenon discovered by John Cairns when he discovered those adaptive *mutations*.

Adaptive mutations occur more frequently when beneficial to the cell, in direct contradiction of the standard neo-Darwinian evolutionary theory, which states that mutations always occur randomly with respect to the direction of evolutionary change.²⁶¹

Finally (for purposes of this paper) the discovery of shared and highly conserved genes regulating fundamental processes of development among phyla separated, assuming a common ancestor, at least since the Cambrian Explosion raises questions from Darwinists and non-Darwinists alike. The similarities in these control genes variously discussed under topics such as HOX genes,²⁶² hoxology and homeotic genes give

261. *Id.* at 259-63. See also Gregory S. Engel, Tessa R. Calhoun, Elizabeth L. Read, Tae-Kyu Ahn, Tomas Mancal, Yuan-Chung Cheng, Robert E. Blackenship & Graham R. Fleming, *Evidence for wavelike energy transfer through quantum coherence in photosynthetic systems*, 446 NATURE 700, 782 (April 2007) (The "wavelike characteristic of the energy transfer within the photosynthetic complex can explain its extreme efficiency, in that it allows the complexes to sample vast areas of phase space to find the most efficient path . . . superposition states formed during a fast excitation event allow the excitation to reversibly sample relaxation rates from all component exciton states, thereby efficiently directing the energy transfer to find the most effective sink for the excitation energy. When viewed in this way, the system is essentially performing a single quantum computation, sensing many states simultaneously and selecting the correct answer, as indicated by the efficiency of the energy transfer." In simple terms, this means the result (high efficiency) determines the means by which the result is achieved.).

262. PAGE & HOLMES, *supra* note 111, at 74. ("The importance of gene duplication in the evolution of multigene families can be illustrated by the family of genes which control the development of body plans in animals. The most important genes of this

evidence to common ancestry, to saltationist theories, and to non-adaptationist explanations based on the presence of genetic material well before any phenotypic expression, that is, non-selected for heritable material. Professor McFadden's explanation of "Life's Biggest Mystery" seems related to the neo-Lamarckian theories previously discussed. If correct this means evolution, in a sense, has direction and perhaps, as Professor Joseph suggests, internal timing mechanisms. This does not mean that Dawkins can no longer be a "spiritually fulfilled atheist." Darwinian Orthodoxy may be as the ropes, but neither intelligent design nor creationism is the necessary alternative.

It should be apparent from the foregoing that all three of the central pillars of Darwinian Orthodoxy are subject to scientific dispute. The "theoretical centrality of Darwin's conclusion" is "that natural selection works through a struggle among *individual organisms* for reproductive success."²⁶³

The traditionally considered agent of evolution is the organism. But does selection act on the organism, the genes, or populations or on all levels? Is this issue settled? Does it make a real difference in applying Darwin's central logic? What is Darwin's central claim? According to Gould, it is the "substitution of natural selection for God as creative agent."²⁶⁴ By operating on individual organisms, that is, effecting reproductive success, selection does not operate in order to achieve a "larger harmony that might embody God's benevolent intent" which nevertheless may be achieved in a sense analogous to Adam Smith's invisible hand.²⁶⁵ What if Joseph is correct and DNA has timing mechanisms? And if the evidence

type in vertebrates are those in the *Hox* family. For invertebrates, like *Drosophila*, the homologous set of genes are called the homeotic gene complex (*HOM*). Like many other developmental genes in eukaryotes, both *Hox* and *HOM* contain a highly conserved protein module known as a homeodomain (or a homeobox if we refer to its underlying DNA sequence). Mutations in the *HOM/Hox* genes can drastically affect the organization of body parts, sometimes making them grow in the wrong places: for example, the *antennapedia* mutant in *Drosophila* causes leg-like structures to grow in place of antennae. The *HOM/Hox* genes probably arose early in the evolution of metazoans and were perhaps one of the most important innovations in the development of multicellular organisms. Indeed, there is also a remarkable conservation of other important developmental genes of *Drosophila* and the homologous *Pax6* gene of humans both affect the pattern of eye development.").

263. GOULD, *supra* note 94, at 125.

264. *Id.* at 127.

265. *Id.*

from molecular biology is correct and speciation occurs in isolated populations where the variety of alleles may be limited, just what the role of selection is as opposed, for example, to genetic drift, in the fixation of new alleles?

Darwin's selection is random and purposeless. How do these assumptions stand up to evidence of adaptive mutations and McFadden's theory of quantum evolution? If genotype alterations and phenotype expression are decoupled on occasion, how does that affect Darwin's theory of natural selection? What of altruism? If selection operates on individual organisms, how does one explain self-sacrifice? One answer is to posit group selection.²⁶⁶

A second pillar of Darwin's central logic is that natural selection is a creative force, essentially the creative force. That is questionable. This is tied to the third pillar of Darwinism or Orthodoxy, that extrapolation from the evidence for microevolution which is largely driven by point mutations supports macroevolutionary events. As Gould points out, variations among alleles "must be copious, small in extent, and undirected. A full-taxonomy of non-Darwinian evolutionary theories may be elaborated by their denials of one or more of these central assumptions."²⁶⁷ As the discussions of challenges to Darwinian Orthodoxy make clear all the central pillars of Darwinian Orthodoxy are being questioned. Evolutionary theory awaits a new paradigm.

V. VIEW POINT DISCRIMINATION

In various opinions, the Supreme Court applies tests discussed under topics denoted neutrality, indoctrination, motivation, obligatory or coercive setting, government sponsorship, and impressionability of the audience in light of the purpose served by the forum. In this regard it may be useful to consider *Hill v. Colorado* again.²⁶⁸ In discussing the content neutrality of a statute restricting approaches to health care facilities, the Court stated that "in speech cases generally and in time, place, or manner cases in particular, [the principle inquiry] is whether the government has adopted a regulation of

266. See ELLIOT SOBER AND DAVID SLOAN WILSON, *UNTO OTHERS; THE EVOLUTION AND PSYCHOLOGY OF UNSELFISH BEHAVIOR* (1998).

267. GOULD, *supra* note 94, at 143-146.

268. 530 U.S. 703 (2000).

speech because of disagreement with the message it conveys.”²⁶⁹ The message often conveyed by critique of Darwinism is religious; hence, it is disagreement with the message by the ACLU and the Darwinian establishment that calls for the disablement of religious free speech under the Establishment Clause. The message itself is held to be a violation of the Constitution. It is not merely a restriction of where some speech may occur or as in *Hill* restricting pro-life individuals from advancing their position in front of abortion clinics, but the forbidding of the speech if it is somehow endowed with governmental endorsement even if it is appropriate to the subject matter and based on supportable evidence.

Since the Court clearly requires content discrimination under the Establishment Clause despite its decision in, for example, *Carey v. Brown*²⁷⁰ wherein the Court held that a statute which placed prohibition on particular topics, while others are allowed, is unconstitutional.²⁷¹

If “Secular Humanism”²⁷² is a variety of atheism and considered a religion then why not Darwinism? Dawkins and others have certainly made it plain that the absence of the concept of a supreme being or a creator does not affect the religious dimensions of Darwinism. If it is so that a reasonable observer knows as much as the Supreme Court presumes he knows, then the assertion that Darwin’s theory is a fact is an inferred endorsement of atheism. Applying the above reasoning to evolutionary theory and taking into account the following discussions, students in a public school classroom should be free to express their views, even if tinged with religious inference, if germane to the topic, as long as the public school or the school’s agent does not step over the line and endorse the religious inference.

In *Cornelius*, the Supreme Court held that in a non-public forum the government must provide a rational basis for the exclusion of views.²⁷³ Put another way, excluding a speaker must satisfy the reasonableness standard and apparently

269. *Id.* at 719 (citing *Ward v. Rock Against Racism*, 491 U.S. 781 (1989)).

270. *Carey v. Brown*, 447 U.S. 455 (1980).

271. *Id.* at 462.

272. *Torcaso v. Watkins*, 367 U.S. 488, 495 (1961).

273. *Cornelius v. NAACP Legal Def. & Educ. Fund, Inc.*, 473 U.S. 788, 796-97 (1985).

cannot be a pretext for view point discrimination.²⁷⁴ Assuming for a moment that at least some critiques of Darwinian Orthodoxy would qualify as protected speech, “[n]othing in the Constitution requires the Government freely to grant access to all who wish to exercise their right to free speech on every type of Government property without regard to the nature of the property or to the disruption that might be caused by the speaker’s activities”²⁷⁵ which leads to sometimes competing interests: that of a public school board to determine its school curriculum and the imputed motivation of government officials to advance traditional religion. The restrictions must be “reasonable and not an effort to suppress expression merely because public officials oppose the speaker’s view.”²⁷⁶ Shouldn’t this rule apply to the ACLU’s efforts to use the courts to impose its views?

In *Greer* plaintiffs were denied a right under the First Amendment to protest and distribute campaign literature on military reservations as long as there was no discrimination among competing views since the purpose of a military reservation was to provide training not to provide a public forum. In short, a military reservation is a nonpublic forum subject to reasonable restrictions consistent with its purpose. The public school classroom, then, cannot be a forum used to advance a religious viewpoint by a government official, which is currently considered a violation of the Establishment Clause. This does not prevent a science classroom from being a place of inquiry and dispute fairly presented consistent with current scientific speculation nor should it preclude a student from expressing a viewpoint consistent with the facts even if inferentially religious in the more traditional sense.

Contrary to the ACLU’s assertion in *Selman*, the definition for purposes of science of “theory” is not necessarily a “thoroughly tested and well-substantiated scientific explanation that can be used to make predictions and hypothesis, and that can incorporate other observations, law, and hypothesis.”²⁷⁷ If it were so, the orthodox Darwinian theory of macroevolution which cannot be thoroughly tested could not

274. *Id.* at 797.

275. *Id.* at 800.

276. *Greer v. Spock*, 424 U.S. 828, 836 (1976).

277. Plaintiff Response to Defendant’s Motion for Summary Judgment at 12, *Selman*.

be taught.²⁷⁸ As pointed out in *Biology* the “just a theory” argument applies to “Darwin’s second claim, his theory of natural selection”²⁷⁹ [the mechanism proposed to explain observed facts]. Further, “good scientists” do not allow theories to become dogma. For example, many evolutionary biologists now question whether natural selection alone accounts for the evolutionary history observed in the fossil record.”²⁸⁰ In fact, in a recent conference at the Konrad Lorenz Institute in Altenberg, Austria sixteen biologists and philosophers met to discuss the possible supersession of Darwinian Orthodoxy.²⁸¹

What is important is that the control over access to a nonpublic forum can be based on subject matter and speaker identity so long as the distinctions drawn are reasonable in light of the purpose served by the forum and are content neutral.”²⁸² The government must avoid the reality and the appearance of favoritism or entanglement with particular viewpoints, unless, of course, those viewpoints might lead to disruption or conflict taking into account the forum involved.²⁸³ In the nonpublic forum the government exclusionary policies are tested under the reasonableness standard.²⁸⁴ This reasonableness is judged not only with reference to the purpose of the forum but also with respect to the surrounding circumstances. Although the purpose of a biology classroom includes the teaching of evolutionary theory the courts are sensitive to the presumed coercive nature of the setting, hence, exhibit a perhaps higher concern than is necessary to potential religious endorsement.²⁸⁵ Reasonableness cannot, however, be a pretext for viewpoint discrimination²⁸⁶ and failing the

278. See, e.g., GEORGE GAYLORD SIMPSON, *THE MAJOR FEATURES OF EVOLUTION* (Columbia University Press 1953) (quoting GOULD, *supra* note 94, at 755). Simpson stated in commenting of the literal appearance of stasis and the geologically abrupt appearance of new forms in the fossil record “[t]hese peculiarities of the record pose one of the most important theoretical problems in the whole history of life.”

279. CAMPBELL ET. AL., *supra* note 7, at 425-426.

280. *Id.* at 426; KIMURA, *supra* note 104.

281. Robert Crowther, *Woodstock of Science Set to Dethrone Darwin's Theory of Evolution*, EVOLUTION NEWS & VIEWS, Mar. 4, 2008, http://www.evolutionnews.org/2008/03/at_scoop_freelance_reporter_su.html (last visited Sept. 4, 2009).

282. *Perry Educ. Ass'n v. Perry Local Educators' Ass'n*, 460 U.S. 37, 49 (1983).

283. *Harper v. Poway Unified Sch. Dist.*, 345 F. Supp. 2d 1096, 1178 (S.D. Ca. 2004) affirmed 445 F.3d 1166 (9th Cir. 2006).

284. *Cornelius*, 473 U.S. at 808.

285. See *id.* at 809.

286. *Id.* at 811.

neutrality test.²⁸⁷ Whether the exclusion of certain groups in *Cornelius*, facially reasonable as it seemed, was “impermissibly motivated by a desire to suppress a particular point of view” was not reached. If so motivated, the Court indicated its decision might have been different.²⁸⁸

Nonetheless, in *Harper* the school authorities clearly desired to suppress a particular point of view—that of religious condemnation of homosexual activity.²⁸⁹ In *Tinker*,²⁹⁰ the prohibition of wearing armbands protesting the Vietnam War in a public school setting was unconstitutional despite the arguments of the school authorities that were quite similar to those in *Harper* where the school authorities were upheld.

The court avoided the apparent inconsistency, by basing *Harper* on a right to be left alone citing *Hill v. Colorado*²⁹¹ and a policy to suppress speech that is potentially injurious to others, specifically the young in a school setting, based on their core identifying characteristics such as race, religion or sexual orientation. It might be productive for the courts as well as school authorities to read a recent article entitled “A Nation of Wimps”²⁹² wherein the author stated that “[p]arents are going to ludicrous lengths to take the bumps out of life for their children. However, parental hyperconcern has the net effect of making kids more fragile; that may be why they’re breaking down in record numbers.”²⁹³

*Aguillard*²⁹⁴ and more recently *McCreary* seemingly raised motivation despite how carefully circumscribed the actual policy, to be the determining factor in whether a school district may prescribe a biology curriculum. Previously, the Supreme Court held that an anti-evolution law violated the Establishment Clause because it selected “from the body of knowledge a particular segment which it proscribes for the sole reason that it is deemed to conflict with” a particular religious

287. See *Village of Schaumborg v. Citizens for a Better Env't*, 444 U.S. 620, 634 (1980).

288. *Cornelius*, 473 U.S. at 812-13.

289. *Harper*, 475 F.3d at 1178.

290. *Tinker v. Des Moines Ind. Sch. Dist.*, 393 U.S. 503 (1986).

291. 530 U.S. 703 (2000) (the “right to be let alone” has been recognized by the Supreme Court of course, “as the most comprehensive of rights and the right most valued by civilized men.”).

292. Hara Estroff Mara, *A Nation of Wimps*, PSYCHOLOGY TODAY, Nov/Dec 2004.

293. *Id.*

294. *Edwards v. Aguillard*, 482 U.S. 578 (1987).

doctrine.²⁹⁵ The Court has also said that, “the state may not, consistently with the spirit of the First Amendment contract the spectrum of available knowledge.”²⁹⁶ After all, the classroom is a “marketplace of ideas”²⁹⁷ and academic freedom should be safeguarded.”²⁹⁸ However, the Courts sensitivity to the presumptively coercive nature of a public school classroom as recognized in *Aguillard* and other cases²⁹⁹ tempers the Court’s concern for free speech when it comes to religion. Of course, a recent case demonstrated that courts are not really neutral but hostile. In *Sherman ex. rel Sherman v. Township High School District 214*,³⁰⁰ the District Court found that statutory language providing for a “brief period of silence . . . for prayer or reflection on anticipated activities of the day . . . ‘compelled’ teachers to discuss the meaning of prayer”, hence, the statute violated the Establishment Clause.³⁰¹ Citing *Santa Fe Independent School District v. Doe*³⁰² the court found that the expressed secular purpose for an arguably religious policy,” was a sham.³⁰³ Might it be suggested that the ACLU’s insistence on the inviability of Darwinian Orthodoxy is a sham covering their real agenda.

The situation in *Aguillard* was not the situation objected to in *Selman*. In *Aguillard* the ACLU objected to any restructuring of school curricula “for the purpose of omitting scientific *theory*, which may conflict with particular religious beliefs.”³⁰⁴ The “Balanced Treatment for Creation Science and Evolution Science in Public School Instruction” act at issue in *Aguillard* did not provide for teaching all the evidence but, in fact, provided for a contraction in that teachers who chose not to teach creation science could not teach evolutionary theory.³⁰⁵ The court cited with apparent approval the view that

295. *Id.* at 593.

296. Bd. of Educ., Island Trees Union Free Sch. Dist. No. 26 v. Pico, 457 U.S. 853 (1982).

297. Sch. Dist. of Abintdon Twp. v. Schempp, 374 U.S. 203 (1963) (Goldberg, J., dissenting).

298. Keyshian v. Bd. of Regents, 385 U.S. 589 (1976).

299. Sch. Dist. of Abington Twp v. Schempp, 374 U.S. 203 (1963); Engel v. Vitale, 370 U.S. 421 (1962); Stone v. Graham, 449 U.S. 39 (1980).

300. *Sherman v. Twp. High Sch. Dist. 214*, 594 F. Supp. 2d 981 (N.D. Ill. 2009).

301. *Id.*

302. 530 U.S. 290 (2000).

303. *Id.* at 308.

304. *Aguillard*, 482 U.S. at 593.

305. *Id.* at 586-89.

"[a]ny scientific concept based on established fact can be included in [the] curriculum"³⁰⁶ In fact, the Court went on to state that "teaching a variety of scientific theories about the origins of humankind to school children might be validity done with the clear secular intent of enhancing the effectiveness of science instruction."³⁰⁷ It was a potential banishment of the mandatory teaching about Darwin's 140 year old theory of evolution that was objected to³⁰⁸ presumably because it limited academic freedom and arose from an improper purpose which had the effect of obliging the participation of objectors in affirming the validity of religious doctrine. This would amount to coercion.³⁰⁹ If, however, a student voluntarily infers a religious explanation from facts presented or recognized theories, there is no constitutional violation.³¹⁰ Similarly, although students are not constitutionally permitted to include prayer at school functions by majority vote,³¹¹ a student who expresses religious views at a school function does not implicate the Constitution.³¹²

This is actually consistent with the position taken by the ACLU when mainline religious free speech is not involved. It claims that "mere exposure to different points of view [does] not constitute indoctrination or formal participation in a religious exercise".³¹³ Despite this, the ACLU objected to a high school biology teacher's presentation of intelligent design materials including excerpts from "Of Panda and People"³¹⁴ presumably because such materials advance religion although a review of those materials leaves little doubt that the spectrum of available knowledge was successful contracted by

306. *Id.* at 587.

307. *Id.* at 594.

308. *Id.* at 596.

309. See *Jones v. Clear Creek Indep. Sch. Dist.*, 977 F.2d 963 (5th Cir. 1992).

310. See *Hodges v. Wauconda Community Sch. Dist.* No. 118, 9 F.3d 1295 (7th Cir. 1993) (where the appeals court held that a school could not prohibit or restrict students' dissemination of religious literature more than other literature.).

311. See *Harris v. Joint Sch. Dist. No. 24*, 41 F.3d 447 (9th Cir. 1994).

312. *Chandler v. Siegelman*, 230 F.3d 1313 (11th Cir. 2000), *reh'g denied* 248 F.3d 1032, *cert. denied* 533 U.S. 916 (2001).

313. See *Smith v. Bd. of Sch. Comm'rs of Mobil County*, 827 F.2d 684 (11th Cir. 1987), where the ACLU defended secular humanism.

314. See ACLU Newswire, *Creationsism, With New Name, Is Taught in Schools* (American Civil Liberties Union (ACLU), May 7, 2001 available at <http://www.aclu.org/news/2001/W050701a>, (last visited on August 21, 2009). (The ACLU asserted that providing materials on intelligent design was "tantamount to teaching religion.").

the ACLU's objection. Due to ACLU intimidation, this veteran school teacher may no longer bring supplemental materials into class. Washington State where this occurred has now adopted as mandatory that students learn traditional Darwinian theory, presumably as fact.³¹⁵ What if the facts lead to other than a Darwinian explanation? If so, any religious inference must be left to the students. The Louisiana act at issue in *Aguillard* failed the first and second prongs of the *Lemon* test because its sponsor had other than a secular purpose and it encouraged religious inference. Putting aside whether Darwinian macroevolutionary theory is based on established facts, it seems that any critique even if based on an established fact could be challenged as unconstitutional if some "benighted" student might make a religious connection but this is not the law. A student's religious inference is not the business of the government as long as the government is not endorsing nor coercing it.

However, the case law developing around the concept of a reasonable observer hints at judicial mind-reading. The reasonable observer is defined as "an informed citizen who is more knowledgeable than the average passerby."³¹⁶

Does this mean that it is the effect on the observer not the intent of the government that is crucial? As was stated in *Kitzmiller*:

Knowing the challenged policy's legislative history, the community's history, and the broader social and historical context in which the policy arose, the objective observer thus considers the publicly available evidence relevant to the purpose inquiry, but notably does not do so to ascertain, strictly speaking, what the governmental purpose actually was. See, e.g., Selman 390 F. Supp. 2d at 1306-07. Instead, the observer looks to the evidence to ascertain whether the policy "in fact conveys a message of endorsement or disapproval" of religion, irrespective of what the government might have intended by it. Lynch, 465 U.S. at 690 (O'Connor, J., concurring) ("the central issue in this case is whether [government] has endorsed Christianity by its [actions]. To

315. According to the ACLU newswire cited *supra*, note 314, Washington State recently adopted academic standards mandate that students learn biological evolution, including how fossil records show patterns of change in organisms over time, how biological evolution accounts for species diversity, adaptation, natural selection and other concepts.

316. *Modrovich v. Allegheny County*, 385 F.3d. 397, 407 (3d Cir. 2004).

answer that question, we must examine both what [the government] intended to communicate...and what message [it conduct actually conveyed. The purpose and effect prongs of the Lemon test present these two aspects of the meaning of the [government's] actions.”³¹⁷

Note in this respect Justice Goldberg's view that the First Amendment does not command “a brooding and pervasive devotion to the secular.”³¹⁸ “[T]here is a crucial difference between government speech endorsing religion, which the Establishment Clause forbids, and private speech endorsing religion, which the Free Speech and Free Exercise Clauses protects.”³¹⁹ It would seem that a court may consider either the motivation of a sponsor of a change in the biology curriculum or whether an objective observer would perceive a Darwinian critique as a state endorsement of religion. The court considers both the forum (for example the public school classroom) and the presentation, that is, how the critiques are presented in a biology curriculum.³²⁰ In short, the context of the message is crucial and may trump the content as in *Selman*.³²¹ Despite some statements to the contrary, motivation may not entirely trump effect. The test is not that the government must have exclusively secular objectives rather that its purpose must not be the advancement of religion.³²² It is true that the Supreme Court has held that banning the teaching of evolution is unconstitutional³²³ because the Arkansas law at issue was, according to the Court, “confined to an attempt to blot out a particular theory because of its supposed conflict with the biblical account”³²⁴ the act banning the teaching of evolution was held not to have a proper secular purpose.³²⁵ Similarly teaching intelligent design as an alternative to Darwinian evolution is consistently viewed as not having a proper secular purpose.

317. *Kitzmiller*, 400 F. Supp. 2d at 722.

318. *Schempp*, 374 U.S. at 306 (Goldberg, J., concurring).

319. *Santa Fe Indep. Sch. Dist. v. Doe*, 530 U.S. 290, 302 (2000).

320. *See Wallace v. Jaffree*, 472 U.S. 38, 76 (1985) (O'Connor, J., concurring).

321. *See Allegheny*, 492 U.S. at 595; *McCreary*, 545 U.S. at 849.

322. *See Lynch v. Donnelly*, 465 U.S. 668, 681 n.6 (1984); *ACLU v. Capitol Square Rev. & Advisory Bd.*, 515 U.S. 753 (1995); *Van Orden v. Perry*, 545 U.S. 677 (2005).

323. *Epperson v. Arkansas*, 393 U.S. 97 (1968).

324. *Id.* at 109.

325. *Id.*

More accurately the teaching of intelligent design as an alternative to a consideration of material causes do not belong in a science class because it does not fit the definition of science. Then, again, should there be a presumption that there are only material or natural causes even if not demonstrated, thus precluding any consideration even by students of a non-material cause. This is hardly neutrality.

VI. A SUGGESTION

Based on the scientific research and theorizing set forth herein, is there an alternative to Darwinian Orthodoxy?

It should be remembered that most genes specify the synthesis of a protein. Regulatory (HOX) genes, however, turn other genes on and off.³²⁶ These regulatory genes are activated by proteins called transcription factors. One transcription factor can control the activation of an array of functionally related genes. With this in mind an alternative to Darwinian Orthodoxy may be described as follows:

(1) Since most point mutations are either neutral owing to the degeneracy of the genetic code³²⁷ or deleterious, natural selection is primarily a negative or neutral process eliminating deleterious mutations without affecting neutral mutations.

(2) Mutations that lead to novelty are concentrated in the regulatory sequences.

(3) Non-coding sections of DNA can be activated by regulatory genes causing significant morphological variations.

(4) Outside stimuli affect both the frequency of mutations and their function.

(5) Outside stimuli and quantum decoherence trigger beneficial mutations including changes in regulatory genes.

(6) Since novelty gives rise to reproductive isolation, outside stimuli might well trigger similar mutations in numerous individuals in a breeding population. This might explain the relative speed in which novel species appear in the fossil record.

(7) The potential for novelty is present in the non-coding regions of the DNA. That potential awaits the appropriate

326. GOULD, *supra* note 94, at 1161-67.

327. Many mutations in the third position of a codon (the three bases pairs that code for protein synthesis) have no effect. See KIMURA, *supra* note 104.

environment stimulus which may explain the evidence of phenotypic-genotypic decoupling in some instances, at least.

This leaves open, as does Darwinian Orthodoxy, the origin of DNA, the functionality of much of the non-coding DNA, the extent of plasticity of gene expression, whether DNA has internal timing mechanisms, the exact relationship between micro and macroevolution, and the role, if any, of genetic drift in macroevolution. In addition, the developmental constraints inherent in the chemical and morphological structure of organisms including their DNA and the proteins actually coded for along with possible mechanisms triggered by environmental factors challenge a purely random and purposeless process and raises neo-Lamarckian, saltationist, orthogenic and even design theoretical possibilities. If so, as Gould suggests, the Darwinian core would be destroyed.³²⁸

This is not to suggest that the above will replace the current paradigm. Rather it suggests how much scientific evidence there is that does not support the central pillars of Darwinian Orthodoxy let alone Darwinism.

How, then, is a school board to protect itself from the ideologically motivated attack of the ACLU, the self-preservational attacks of those wedded to the current paradigm, and the meddling interferences of judges? The answer has been suggested above. In addition, a well thought out statement by a prominent biologist explaining what a theory is, what the observed facts are, what a testable hypothesis includes and what gaps in understanding remain is in order. The Dover Board made the mistake of setting up as an alternative to Darwinian Orthodoxy, which the court confused with the definition of evolution, the "theory" of intelligent design, which the court took to be an endorsement of religion. The affirmative presentation of the design inference and the religious motivation of those seeking reform removed this from the sphere of governmental neutrality under the current case law. In this respect, the Selman Sticker should have passed constitutional muster if neutrality is to be taken seriously. The fact that some of those supporting the Sticker operated from religious motives should not have trumped a legitimate secular purpose. Just because the secular purpose of exploring the increasingly turbulent area of evolutionary

328. *Supra* note 124.

theory might incidentally satisfy a religious impulse is not the test. What must be avoided is the affirmative act of the Dover School Board. The manifest objective of the school board to aid a traditional religious interpretation in critiquing the Modern Synthesis is dispositive of the constitutional enquiry despite the merits of the arguments. If a school board is careful about how critiques are presented a judge may well properly find a secular purpose. That purpose is to further the education of public school biology students by providing an understanding of the factual and theoretical basis of an area of science undergoing change. Under current judicial oversight, it is the affirmations of religious precepts that are disabled not the reasoned inferences of students and teachers, the later being careful to avoid endorsement of any religion including atheism and the philosophical inferences of Darwinism.

VII. SUMMARY AND CONCLUSION

There is increasing evidence of directed adaptationist mutations as opposed to randomness; there is little evidence of gradualism; there are only speculative theories regarding complex systems; there is no accepted theory for the origin of life on earth, and extrapolation cannot be demonstrated in a Darwinian sense, yet the Darwinian paradigm persists as “fact”. Unfortunately public schools are so fearful of lawsuits for violating the Establishment Clause that biology teachers must fear for their jobs let alone tenure if they question the prevailing orthodoxy.

The ACLU’s anti-intellectual position in *Selman*, that any critique of Darwinian evolution is motivated by intelligent design or biblical creation advocates, which the ACLU wrongly and purposely conflates,³²⁹ and the failure of balanced

329. See Plaintiff’s Statement of Material Facts to Which There Exits a Genuine Issue to be Tried, wherein the ACLU alleged:

The school board members concocted a scheme to assert that a dispute exists in science about the legitimacy of evolution. The school board wanted to inform students that they contend that evolution is involved in a scientific dispute with intelligent design/creationism. Their intent was to discredit evolution. At 3.

...

The disclaimer was accepted because the school board wanted to promote the discussion of intelligent design/creationism in the classroom. At 5.

...

Promoting the existence of a creator, as the school board is doing, is not only promoting a religious doctrine, but also necessarily leads to discussion of religious concepts such as omnipotence, sin, evil and salvation. At 6.

treatment acts to withstand constitutional challenge in *Epperson* and *Aquillard* should by no means discourage those who wish to reform and modernize the biology curriculum in public schools. Although the constitutional violation in *Epperson* and *Aquillard* was based on the first prong of the *Lemon* test, that is, lack of a secular purpose as determined by an analysis of the motivation of the sponsors of such acts as opposed to the validity of the criticisms, the holding should have been based on evidence of a coercive effect favoring mainstream religion. This is based on requiring the teaching choices to be either or with a religiously favored inference (not Darwinism) in what is held to be a coercive setting. Although it is difficult to be neutral, the Court said in *Employment Division, Department of Human Resources of Oregon v. Smith*³³⁰ that valid and neutral laws, and by analogy curricula of general applicability, whether consistent or inconsistent with religious views are constitutional.³³¹ Incidental offense to the traditionally religiously observant or non-observant is not the test.³³²

In *Malnak v. Yogi*,³³³ the Third Circuit held that for Establishment Clause purposes transcendental meditation was a religion, hence, the government cannot aid in its propagation. If transcendental meditation is a religion it is hard to argue that Darwinism is not. To forbid the teaching of alternatives to Darwinian Orthodoxy is to establish those inferences so obvious to Dawkins, Dennett and other like-minded scientists and philosophers. The compelling state interest is not to violate the Establishment Clause not to establish view point discrimination. It is not the business of the government to interfere with academic freedom even if the subject taught is consistent with certain religious belief³³⁴ or with the right of a state to prescribe its public school curriculum as long as any improper motivation, if present, does not result in coercing or

330. 494 U.S. 872 (1990), *rehearing denied*, 496 U.S. 913 (1990).

331. *Id.* at 877-78.

332. See *Goldman v. Weinberger*, 475 U.S. 503 (1986) (upholding a rule against yarmulkes in the military); *O'Lone v. Estate of Shabazz*, 482 U.S. 342 (1987) (no constitutional violation is involved for refusing to modify work schedules to suit Muslims).

333. 592 F.2d 197 (3d Cir. 1979). The court also references concerns with ultimate questions and ritual. (Judge Adams concurring in a *per curiam* decision.)

334. See, e.g., *McGowan v. Maryland*, 366 U.S. 420 (1961).

endorsing a religious view.³³⁵ In summary, when deciding whether there is a constitutional violation, context and purpose both affect the outcome. Incidental offense to someone's religion is rejected by *Goldman* and *O'Lone*³³⁶ as an element to be considered if a generally applicable law is constitutional. Similarly, the presumed religious views of a majority if advanced in an allegedly coercive setting with implicit or explicit government approval or in any governmental setting with explicit approval which can be inferred from the circumstances may be suppressed.³³⁷

Crucial to Supreme Court decisions which reference neutrality is where the activity occurs and who is directly affected. For example, religious released time for in public school instruction is unconstitutional.³³⁸ Religious released time for instruction other than a public building is constitutional.³³⁹ Hence, critiques of Darwinian theory that merely incidentally support religious belief should not make those critiques unconstitutional. Based on the volume of material now available, the credentials of those having second thoughts about Darwinian Orthodoxy, and the lack of direct, empirical evidence for Darwinian macroevolution, the attempt of the ACLU and its allies to impose Darwinian Orthodoxy as fact constitutes unconstitutional viewpoint discrimination because the motivation is clearly one of hostility towards traditional religious inference.³⁴⁰

The secular "purpose prong of the *Lemon* test asks whether government's actual purpose is to endorse or disapprove of religion."³⁴¹ A state sponsored practice is violative of *Lemon* only if it is predominately motivated by a purpose to advance religion.³⁴² The fact that the Sticker issue in *Selman* may in

335. Bd. of Educ., *Island Trees Union Free Sch. Dist. No. 26 v. Pico*, 457 U.S. 853, 864 (1982); *Wallace v. Jaffree*, 472 U.S. 38, 75 (1985) (O'Connor, J., concurring in the judgment).

336. *Supra* note 332.

337. *McCreary*, 545 U.S. 844; *Van Orden*, 545 U.S. 677.

338. *McCollum v. Bd. of Educ.*, 333 U.S. 203 (1998).

339. *Zorach v. Clauson*, 343 U.S. 306 (1952).

340. *See Zorach* at 314 (the Court made plain that the Establishment Clause does not require the government to be hostile towards religion).

341. *Lynch v. Donnelly*, 465 U.S. 668, 690 (1984); *Wallace v. Jaffree*, 472 U.S. 38, 56 (1985); *Brown v. Gwinnett Cty. Sch. Dist.*, 112 F.3d 1464, 1471-72 (11th Cir. 1997).

342. *Adler v. Duval County Sch. Bd.*, 206 F.3d 1070, 1084 (11th Cir. 2000) (*en banc*), (citing *Wallace*, 472 U.S. at 56), *vacated on other grounds*, 531 U.S. 801 (2000), *reinstated*, 250 F.3d 1330 (11th Cir. 2001); *Brown v. Gwinnett Cty. Sch. Dist.*, 112 F.3d

part be motivated by a religious purpose should not be sufficient to make the practice unconstitutional.³⁴³ As long as the state agency acts in a manner consistent with the dictates, as determined by the Supreme Court, of the First Amendment, the courts will defer to a state's articulated secular purpose.³⁴⁴ The objection of the ACLU to the Sticker in *Selman* is that it denigrates evolution by singling it out as "a theory, not a fact" and asks students to "critically" consider evolution. The *Selman* court, in partial support of the ACLU's position, stated with apparent disapproval that "[a] cursory reading of the sticker would likely posit doubt in the mind of the reader regarding the merits of evolutionary theory when those doubts might not otherwise exist."³⁴⁵ Exactly why one should not have doubts about (Darwinian) evolutionary theory is not clear in view of how many eminent scientists either disagree with the Modern Synthesis in one way or another or reject one or more pillars of the central logic. To equate the theory of Darwinian macroevolution with the germ theory of disease (directly verified), the theory of gravity (its effects, if not its mechanism, are directly observed),³⁴⁶ plate tectonics (detected plate movement by scientific apparatus), atomic theory (verified by experiment), Newtonian physics (verified by observation and experiments as explanatory of non-quantum events), and Galilean heliocentrism as the ACLU does is nonsensical.³⁴⁷ Theory is defined as an "[e]xplanatory hypothesis, *usually* firmly founded in observation and experiment. . . [theories] are tested by examining whether their consequences (predictions) are borne out by observation and experiment."³⁴⁸ Evolution, insofar as it refers to a fossil record that is diverse, DNA similarities across all living things and other such observable phenomenon is indeed a fact; insofar as evolution refers to a mechanism explaining the rise of new taxonomic groups, it is an inference.

The second prong of *Lemon* is not violated if religion is not endorsed or coercively advanced. A critical analysis of

1464, 1471-72 (11th Cir. 1997).

343. *Edwards*, 428 U.S. at 587.

344. *Id.* at 583.

345. Order of the Court ¶ 9, *Selman*.

346. Note that Einstein's theory of general relativity "corrected" Newton's theory.

347. Plaintiff's Statement of Material Facts 14 no. 35, *Selman*.

348. PENQUIN DICTIONARY OF BIOLOGY 614 (emphasis added).

evolutionary theory must not under current judicial mandates posit a religious explanation as an alternative,³⁴⁹ although a student should be free to make such inferences. The *Selman* court wrongly considered the ACLU's argument that the primary effect of the challenged Sticker is to advance religion when it should have focused on the validity of the science. The fact that the Sticker may inferentially advance or support religious beliefs should not make it unconstitutional. Most questionable and of major concern to any school board is the *Selman* court's apparent willingness to "entangle" itself by monitoring what is taught (via never ending lawsuits?).³⁵⁰

There now is little doubt that the courts have imposed a unique disability on religion and religious speech for Establishment Clause purposes.³⁵¹ The courts prohibition on government specifically aiding religion, while being free to aid everything else, is best illustrated by Justice Brennan's attack on the formerly privileged position of Christianity.³⁵²

It might be useful to revisit *West Virginia State Board of Education v. Barnett*³⁵³ where the Court in upholding the right of students who were Jehovah's Witnesses to refuse to salute the flag stated "[p]robably no deeper divisions of our people could proceed from any provocation than from finding it necessary to choose what doctrine and whose program public educational officials shall compel youths to unite in embracing. . . it is that no official. . . can prescribe what shall be orthodox in politics, nationalism, religion, or other matters of opinion"³⁵⁴ In a statement that seems prophetic the Court also said, "[f]ree public education, if faithful to the ideal of secular instruction and political neutrality will not be partisan or the enemy of any class, creed, party, or faction. If it is to impose any ideological discipline, however, each party or denomination must seek to control, or failing that, to weaken

349. See, e.g., *Freiler v. Tangipahoa Parish Bd. of Educ.*, 185 F.3d 337, 346 (5th Cir. 1999).

350. Order of the Court ¶ 17, *Selman*.

351. See *McCreary*, 545 U.S. 844; CASS R. SUNSTEIN, *THE PARTIAL CONSTITUTION* 307 (1994).

352. *Lynch v. Donnelly*, 465 U.S. at 718 (Brennan, J., dissenting). Brennan, in dissenting, distanced the Court from the U.S being a "Christian Nation" stating that it would be "a long step backwards to the days when Justice Brown could arrogantly declare for the Court that this is a Christian nation." *Id.* (citing *Church of the Holy Trinity v. U.S.*, 143 U.S. 457, 471 (1892)).

353. 319 U.S. 624 (1943).

354. *Id.* at 642.

the influence of the educational system”³⁵⁵ Similarly in *Keyishian v. Board of Regents of the University of the State of New York*³⁵⁶ the Court stated that the First Amendment “does not tolerate laws that cast a pall of orthodoxy over the classroom . . . [which is] peculiarly the market place of ideas.”³⁵⁷ Further, unless a sham, “the government’s assertion of a legitimate secular purpose is entitled to deference.”³⁵⁸

From the foregoing analysis, the connections between and among “secular legislative purpose”, “motivation”, “endorsement and “neutrality” becomes somewhat clearer. The motivation of some even if religiously based, should not determinative if a neutral result may be shown with which the Court can find a secular legislative purpose. Endorsement or the perception thereof is affected by the context, that is, where, when and who is the reasonable observer.³⁵⁹ A reasonable observer would not mistake a generalized reference to God on a public building as an endorsement, on the other hand, a public school student would, according to the Court, believe at a graduation that school prayer would be an endorsement, although, one can argue that what really bothered the Court is the presumed “attack” on non-believers potentially effecting their self-esteem.³⁶⁰ Of course, if the only alternative to Darwinism is creationism or intelligent design, the Court will find endorsement, and a non-secular purpose.

The Supreme Court has held that a state’s interest in avoiding an Establishment Clause violation is compelling and therefore justifies content-based discrimination. This was reaffirmed in *Good News Club*.³⁶¹ The crucial issue is whether there is a realistic danger that the state agency involved is endorsing a religion or any particular creed.³⁶² Neutrality is the principle elucidated in those cases involving benefits to recipients of government aid.³⁶³ Incidental benefits to a

355. *Id.* at 637 (emphasis added).

356. 385 U.S. 589 (1967).

357. *Id.* at 603.

358. *ACLU of Ohio v. Capital Square Review and Advisory Bd.*, 243 F.3d 289, 307-08 (6th Cir. 2001) (quoting *Brooks v. City of Oak Ridge*, 222 F.3d 259, 265 (6th Cir. 2000)).

359. *Widmar v. Vincent*, 454 U.S. 263, 271 (1981).

360. *See generally, Harper*, 475 F.3d 1096.

361. *Good News Club*, 533 U.S. at 112-13.

362. *Lamb’s Chapel*, 504 U.S. at 395.

363. *See Rosenberger v. Rector and Visitors of the Univ. of Va.*, 515 U.S. 819, 832

religious organization are not fatal as long as neutral criteria are followed.³⁶⁴ In explaining *Aguillard*, the Court in *Good News Club* stated that when the school was not actually advancing religion, the impressionability of students would [not necessarily] be relevant to the Establishment Clause issue,³⁶⁵ although the Court did indicate the standard might be different for elementary and high school students.³⁶⁶ The *Good News* court endorsed Justice O'Connor's statement that, "[b]ecause our concern is with the political community writ large, the endorsement inquiry is *not about the perceptions of particular individuals* or saving isolated non-adherents from. . .discomfort. . .It is for this reason that the reasonable observer in the endorsement inquiry must be deemed aware of the history and context of the community and forum in which the religious [speech takes place]" (emphasis added)).³⁶⁷

If various scientifically based options are offered as an alternative for one or more aspects of the central logic of Darwinian Orthodoxy it is difficult to conceive of a successful Establishment Clause challenge although concern with judicial supervision of the curriculum is not misplaced. Of course, those options must have some connection with factually-based observations or experimentation,³⁶⁸ although intelligent design because of its religious connotations and despite its explanatory power must now be excluded from science class.

While stating that "requiring schools to teach creation science with evolution does not advance academic freedom," the Court also indicated that a science curriculum that granted teachers a "flexibility . . . to supplement the present science curriculum with the presentation of theories, besides [Darwinian] evolution" would be acceptable.³⁶⁹ In fact, the Establishment Clause forbids the tailoring of teaching to advance any religious doctrine or dogma.³⁷⁰ Is there any doubt

(1995) (holding that the University of Virginia violated the Free Speech Clause when it refused to pay for a religious student organization's publication costs under a program that funded other student organization's publications).

364. *Id.* at 821.

365. *Good News Club*, 533 U.S. at 104.

366. *Id.* at 2104 n.7, 2106.

367. *Capitol Square Rev. & Advisory Bd. v. Pinette*, 515 U.S. 753, 779-80 (1995) (O'Connor, J., concurring in part and concurring in the judgment).

368. *See Cornelius*, 473 U.S. at 806.

369. *Aguillard*, 482 U.S. at 587.

370. *Epperson*, 393 U.S. at 106.

that Darwinian Orthodoxy has become dogma, both in support of an explanation for the rise of new taxonomic groups and to further a particular world view? But is it religious dogma or merely the favored conventional wisdom? Isn't the effective mandating of Darwinian Orthodoxy the effective mandating of its philosophical inferences? Can those inferences be avoided when courts conflate critiques of Darwinian Orthodoxy as critiques of observed facts of evolution narrowly defined? The Establishment Clause "limits the discretion of state officials to pick and choose among [competing theories] for the purpose of promoting a particular religious belief,"³⁷¹ or one might add, a particular worldview which according to its advocates serves the same functions as religion.

After all, the Court has discerned that "[a]t the heart of liberty is the right to define one's own concept of existence, of meaning of the universe, and of the mystery of human life. Beliefs about these matters could not define the attributes of personhood were they formed under the compulsion of the state."³⁷² The imposition of Darwinian Orthodoxy as truth through the use of an agency of the state justly may be seen as a threat to "personal dignity and autonomy"³⁷³ posing a threat to student decision-making and teacher academic freedom.

In no area jurisprudence has the ignorance of the courts, the stubbornness of creationists, the ideological commitment of those hostile to traditional religion, and the Supreme Court's failure to define religion consistently for Establishment Clause and Free Exercise Clause purposes better demonstrated the immiscibility of law and science.

371. *Aguillard*, 482 U.S. at 604 (Powell, J., concurring; O'Connor, J., joining in the concurrence).

372. *Planned Parenthood v. Casey*, 505 U.S. 833, 851 (1992).

373. *Id.*